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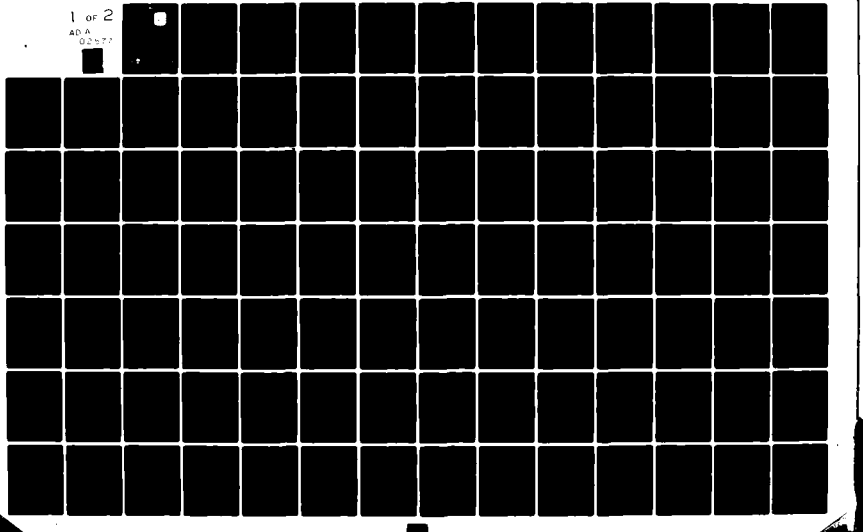

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STUDY PROJECT

29 MAY 1981

COMBAT ENGINEER OPERATIONS IN A NUCLEAR/CONVENTIONAL ENVIRONMENT

by

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This study was undertaken to examine the role of combat engineer support to a battalion task force facing both conventional and nuclear environments. The authors intuitively believe that the tactical doctrine evolving from the defensive oriented warfighting approach envisioned in the European theater needs to be better understood for optimum use of the limited combat engineers available to enhance a favorable battle outcome. This study, therefore, is oriented toward developing a methodology for analysis of engineer support and

then the application of that methodology to a specific combat engineer support area to understand better trade-offs associated with combat engineer force application.

USAWC MILITARY STUDIES PROGRAM PAPER

COMBAT ENGINEER OPERATIONS IN A NUCLEAR/CONVENTIONAL ENVIRONMENT.

A GROUP STUDY PROJECT

by

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29 May 1981

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A special acknowledgement must go to MAJ Michael Diffley, from whose fertile mind sprang many of the analysis concepts incorporated in the study. His assistance throughout the project, at the expense of his own work, was instrumental in its success. MAJ Diffley is also a co-author of the article at Inclosure 2.

Armor and Engineer colleagues who contributed to the study through numerous discussions with the authors included USAWC Students, LTC Sonny Sloan (AR), LTC Phil Medenbach (AR), LTC Jed Brown (EN) and BG Uri Sagie (AR) of the Israeli Defence Force. LTC Kent Harrison, Department of Tactics, USACGSC, contributed during the conceptual development stage, as did LTC Al Robb of the USAWC Faculty, who offered many good leads on informational sources.

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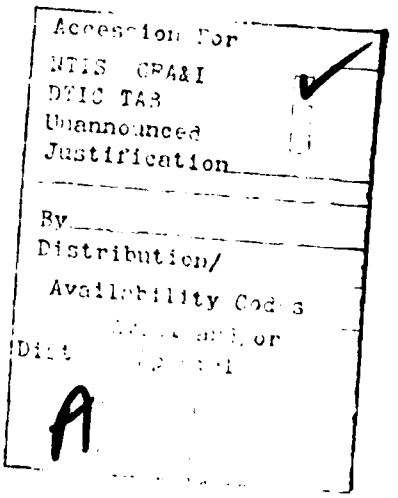
Finally, a special word of thanks must go to COL Ron Roberge, our Faculty Advisor, for his sponsorship and support of this project; his constructive critique during the In Progress Review (IPR), which resulted in overall study improvement; and last, but not least, his eternal patience, so much in evidence during the authors' final, frantic efforts to pull the entire project together in order to graduate.



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PURPOSE

This study was undertaken to examine the role of combat engineer support to a battalion task force facing both conventional and nuclear environments. The authors intuitively believe that the tactical doctrine evolving from the defensive oriented warfighting approach envisioned in the European theater needs to be better understood for optimum use of the limited combat engineers available to enhance a favorable battle outcome. This study, therefore, is oriented toward developing a methodology for analysis of engineer support and then the application of that methodology to a specific combat engineer support area to understand better trade-offs associated with combat engineer force application.

OBJECTIVES

The objectives of this study are to understand better the nuclear and conventional environments facing combat engineers on the modern battlefield; to devise a methodology for analysis of engineer tasks and thereby create a mechanism for evaluation of mobility, countermobility, and survivability payoffs to the maneuver force; examine engineer doctrine as relates to the nuclear and conventional environment; and to identify issues requiring further study.

GENERAL APPROACH

The study effort initially focused on background reading, interviews and visits to the Engineer School at Ft. Belvoir, Defense Nuclear Agency, Army Nuclear Agency and the Combined Arms Center at Ft. Leavenworth, Kansas. Working under general guidance from the DCS Doctrine, TRADOC, the authors initiated an effort to develop a methodology and an analysis base to support

TRADOC's contribution to the VCSA directed Special Program Review (SPR) on Mobility, Countermobility and Survivability which was held on 8 and 9 April. Preliminary study briefing results were provided to the DCS, Doctrine, TRADOC and Director, Combat Development, USAES prior to the SPR. The major component of this study was the briefing given these principals. Portions of the briefing were subsequently included in the SPR presentation by the TRADOC DCS, Doctrine. The briefing is contained at Inclosure 1. This research effort has also resulted, to date, in one article to be submitted for publication (Inclosure 2). A second article is currently being drafted; however, time does not permit its inclusion.

The methodology used herein to analyze engineer requirements is referred to as a "client analysis." The technique is to select a specific type and size supported force as the client, then investigate the nature and scope of engineer, combat support requirements, given battlefield environment and type operation (e.g., active defense, counterattack, etc.). The technique permits evaluation and prioritization for commitment of engineer resources to maximize the "combat multiplier" for the supported force. This is contrasted with what we'll refer to as a "function area analysis," which sums engineer manpower and equipment requirements, by functional area (mobility, countermobility, and survivability), but which does not lead to development of tactical doctrine for engineer combat support. Numerous studies are available which state quantities of engineer assets required by geographical area or by a certain day of the war; however, these do not address how those assets are best employed. It is the latter issue that is of concern to the researchers, i.e., the lack of development of a doctrine for engineer combat support in an integrated environment (nuclear, chemical and conventional).

The client selected for the study is the tank heavy, battalion task force (direct and indirect fire elements only) in both nuclear and conventional environments. The study itself is a component that can be easily expanded to examine other elements of this client (e.g. C^3 or air defense systems), or other clients. Each of these micro-client analyses can then be aggregated for organization and doctrine development of brigade/division size engineer units. The researchers feel strongly that this "client analysis," as opposed to a macro or "functional area analysis," is the key to such development.

The following chapters detail the study approach and environment analysis.

COMBAT ENGINEER SUPPORT IN A NUCLEAR ENVIRONMENT

Description

In an effort to understand better possible priorities for the maximum engineer payoffs for resource commitment, a nuclear vulnerability analysis was developed for two major weapons systems -- the tank and the self-propelled artillery gun and support equipment. This analysis was designed to highlight potential payoffs for combat engineer effort to enhance the effectiveness of lack of these systems to operate in a nuclear environment.

Each of the systems were subjected to a nuclear environment consisting of the size weapons which the Soviets might reasonably be expected to employ. The larger yield weapons delivered in the rear areas the smaller yield in the forward areas close to the FEBA. Specifically, the larger yields chosen for analysis were the 300 and 100 KT weapons and the smaller yield, 10 KT, near the front. The artillery system and support equipment were subjected to the larger weapons effects and the tank to the smaller weapons.

Approach

The basic engineer task of digging in these systems was the measure of effort to determine resource application for potential payoff -- preserving for each system its capability to perform its basic combat mission.

First, the nuclear effects of the selected Soviet weapons were developed to provide a basis for analysis of the relative value of digging in a system with its operating personnel to gain a measure of potential system survivability should engineer effort be allocated to that system.

Second, disbursion criteria were developed based upon a range of battlefield densities for the artillery and tank systems such that an exposure

range to the various nuclear effects could be developed. This then could lead to the "bottom line" -- the potential payoff in systems surviving by combat engineer effort investment.

Densities of the artillery systems were derived from actual data of numbers of batteries per kilometer of front in the European theater. The range, from the highest density 6 batteries per brigade across a 12 kilometer front and a 3 kilometer deep artillery band (1 battery per 6 Km^2) to the lower density of 3 batteries per brigade on an 18 Km front and a 9 Km artillery band (1 battery per 54 Km^2). Assuming a normal distribution, the 80 percent upper and lower densities chosen for the analysis are 1 battery per 10 Km^2 and 1 battery per 38 Km^2.

Results

Shown at Figure 1 are the effects of the 300 KT airburst at three distances from ground zero. The distances selected represent thresholds where personnel and/or system survivability are meaningful. At 1800 meters from ground zero, even if the unit is dug in, it is no longer mission capable. Dominant effects, if dug in, are overpressure on equipment and a combination of effects on personnel. At 2100 meters being dug in represents the difference in remaining mission capable or not. Comparing dug in at 2100 meters with not dug in at 2600 meters shows roughly equivalent unit capabilities. The gain area-wise by being dug in, therefore, can be represented by the difference between these two, or approximately 35 percent. This gain may even be somewhat higher, given that being dug in enables a unit to be mission capable somewhere between the 1800 and 2100 meter distances. For this analysis the difference between the 35 percent area gain

estimate and the 52 percent difference between 2600 and 1800 meter areas represents a "favorable error band."

A sketch of a dug in artillery firing position is shown at Figure 1. All equipment and personnel are completely below ground level and are protected from the blast shock wave which is the dominant effect at distances beyond 1800 meters from ground zero.

A key factor toward fully understanding the potential gain by digging in the artillery system is to evaluate our ability to move before the enemy can acquire our location and deliver a weapon. Obviously, a very large yield weapon can, by area coverage, destroy a target without regard to target acquisition details. However, in a rational use of nuclear weapons and enemy consideration of future maneuver options a more planned strike against specific targets is likely. In the array of the data from the analysis the specific yield of the weapon allows the construct of a graph to detail the advantages of being dug in. Combining the unit density analysis, the effects from the 300 KT airburst and relative target acquisition abilities enables resolution of the survivability component of combat engineer effort.

Shown on Figure 3 is a plot of the effects of the 300 KT weapon against the less dense case of 1 battery per 38 Km^2. The abcissa plots relative target acquisition abilities in a range from Red beating Blue; that is, Red acquiring and shooting before Blue could move, to a range of Blue beating Red -- blue moves successfully before Red can acquire and shoot. Zero represents a point where our shoot and move equals his target acquisition and fire capability. On the ordinate are expected battery losses. This plot represents a synthesis of the effects data shown in Figure 1.

If Red's target acquisition response is equal to Blue's shoot and move capabilities, then the expected battery loss is .5, except that the lethal area coverage for a 300 KT for not dug in (21 Km^2) covers 51 percent of the battery area (38 Km^2). Therefore, if the artillery is not dug in, it can never expect to lose less than .51 battery per Red 300 KT weapon even if Red forgets about target acquisition and resorts to terrain fire. On the other hand, if the artillery is dug in, the expected loss per weapon can be reduced to .32, or perhaps as low as .26 given the "favorable error band." These reductions are the area reductions from 2600 meter lethal radius, to the 2100 and 1800 meters respectively.

In the more dense (1 Battery/10 Km^2) case, shown at Figure 4, for artillery not dug in, the expected losses will be equal to the number of batteries expected to be in the lethal area of 21 Km^2. Assuming optimum dispersion then the loss per Red 300 KT weapon would be expected to be 2.1 batteries regardless of target acquisition capability. Random terrain fire will result in the same losses; therefore, shoot and move gains nothing. Digging in, however, will reduce the expected losses to 1.35 batteries per weapon or lower, if one considers the maximum limits of the favorable error band.

Similar curves are shown at Figure 5 for the 100 KT weapon for comparison with the 300 KT. Battery densities are the same as with the 300 KT. As shown for both the more and less dense cases, digging in reduces the expected losses per weapon by 30 percent.

In the tank analysis, radiation is the dominant effect for the postulated 10 KT weapon. If the tank is dug in such that the turret is below ground

level, the soil shielding radiation transmission degradation of .6 begin to take effect. Taken alone, the .6 transmission factor offered by the soil represents a 10-15 percent gain area wise, for a spectrum of ranges, due to digging in. Even then the type gain does not permit a conclusion of clear mission capability as crew members will probably die from the radiation exposure -- the question is how soon. Even with this uncertain survivability gain, the fighting capability of the tank in full turret defilade is negated. Digging in a fighting position in hull defilade does not offer any new protection from the radiation effects.

The conclusion from this analysis is that there is little survivability gain for the tank by digging in in the nuclear environment; therefore, priority for combat engineer effort should go to artillery over tanks.

MOBILITY IN A NUCLEAR ENVIRONMENT

Description

Tactical nuclear weapons of large yields will create area mobility problems, which must be considered when evaluating (planning) terrain for offensive or defensive operations. Gross assessments of mobility problems in a nuclear environment suggest an almost overwhelming requirement for engineer mobility support across the battlefield, attempting to counter the effects of massive rubbling, tree blowdown, cratering and residual radiation contamination. Although the situation at the time will dictate priorities for allocation of available engineer resources, it is useful to attempt to define more clearly the problem in terms of type units which might be most vulnerable by these effects. The methodology for the study enables an evaluation of nuclear effects on mobility for a specific type client, then

a decision on resource allocation to mitigate the effects of the degraded environment. The mobility degradation of the tank heavy battalion task force are described as follows.

Rubbling of a built-up area of any size will effectively close primary routes passing directly through the area until cleared by engineers. It's unlikely, however, that tracked maneuver and fire support elements would need those routes; instead they could bypass with minimum mobility penalty. The possible exception might be where access to an important bridge is only possible through a large city. The question then arises, if the city is rubbled, constructing an alternate crossing site may be accomplished as quickly as clearing a route through the city. Therefore, the potential for engineer requirements in rubbled areas for the tracked elements of a battalion task force is minimal.

The mobility impact of tree blowdown varies significantly by type vehicles in a unit. Tracked vehicles traversing such an area are obviously less affected than wheeled vehicles. The analysis of the tank heavy battalion task force focused on the mobility problems associated with the movement of tanks and APC's through a forest blowdown area.

A US-Canadian study of the effects of tree blowdown on mobility serves as the principal reference for this component of the analysis. The study, entitled "Nuclear Weapons Effects in a Forest Environment," evaluated a Centurion tank and an M-113 traversing a coniferous forest, tree blowdown area. In the study, the Centurion tank was able to traverse the fallen trees at an average speed of 10 Km/hr and the M-113 5-9 Km/hr. In contrast, the D-7 clearing rate evaluated in the study averaged approximately 1000 meters

per hour. The conclusion drawn from the study is that engineer mobility support will not be needed to assist tracked vehicles in traversing a tree blowdown area.

Maneuver units can also minimize the mobility impact of tree blowdown if they locate near the edges of forests and preplan movement on routes that move them out of the forested area via the shortest distance consistent with the tactical plan.

We recognize that wheeled vehicles would need extensive assistance in traversing a blowdown area. This study, however, did not include analysis of engineer support to other than battalion task force tracked elements operating in the forward combat zone.

Soviet nuclear doctrine suggests the use of "air burst" as opposed to "surface burst." This limits residual radiation to allow Soviet use of the terrain for maneuver if the battle develops in their favor. If by accident or plan, a ground burst should occur resulting in a crater, the residual radiation and fallout would pose a serious health hazard downwind from ground zero. Maneuver planning should then consider avoiding the crater and downwind areas if radiation levels pose an unacceptable cumulative dose to soldiers. In either situation there is little case to be made for crater fill in as an engineer concern in the forward combat zone.

Radioactive contamination of the soil in the area of an airburst will pose a temporary problem by excluding transit by vehicles until the highly radioactive elements from the detonation decay to a safe level of 150 rad total dose during transit. Immediately after a nuclear detonation, the soils' aluminum, manganese and sodium will be activated to levels as high as 10,000 rad/hr. However, the major contributor to this activity, aluminum,

has a half-life of only 2.6 minutes. Therefore, these levels of radioactivity diminsh rapidly (by a factor of 100, one hour after the burst).

A worse case in this environment involves surviving APC's commencing movements toward and through ground zero immediately after the blast. As shown in Figure 6, an APC moving through ground zero for a nuclear yield of 100 KT, at an average speed of 10 Km/hr, and starting from a point 1360 meters from ground zero (minimum range for system and crew survivability), would receive an expected dosage of 370 rads during transit. If, on the other hand, it initially delayed movement for 3 minutes, transit could be accomplished with an expected cumulative dosage to the crew of 150 rads. Similar figures are shown for other yields and a movement rate of 40 Km/hr.

In summary, the nuclear environment imposes some constraint on a tracked battalion task force. The constraints, however, are not dependent upon combat engineer support to allow the maneuver force to continue to fight and maneuver.

Countermobility will play a key role in developing a force multiplier to enhance the effectiveness of our forces in any environment -- conventional, nuclear or chemical. In the air land battle of the "90's" inhibiting enemy ability to be mobile will be a key factor in a favorable battle outcome. This component of engineer capability to constrain enemy movement by terrain enhancement or obstacle construction will be addressed later in this study.

ENGINEER SUPPORT TO THE BATTALION TASK FORCE IN THE CONVENTIONAL ENVIRONMENT

General

Tactical doctrine for employment of engineer resources in a conventional environment is, as might be expected, better developed than that for the nuclear environment. A review of conventional doctrine is needed, however, to evaluate the payoffs in terms of combat multipliers to the selected client force, and to correlate the resource application priorities with those suggested by research results for the nuclear environment. The approach in this section is similar to that taken for the nuclear environment, i.e., requirement for combat engineer support to the client task force is investigated for the functional areas of survivability, mobility and countermobility, and payoffs are evaluated to determine a priority of employment for engineer resources.

Survivability

Within the Engineer community there is an evolving tactical doctrine calling for the use of engineer resources to prepare successive, protected positions from which to fight tanks. Much of this evolution is currently being driven by the need to justify the new M9, Armored Combat Earthmover (formerly Universal Engineer Tractor). In a recent M-9 Effectiveness Analysis conducted by the US Army Engineer School, survivability of the M1 tank is shown to be improved by 32 percent due to the M-9's additional capability to move and dig, vis a vis the D7 dozer system (dozer and 10 ton prime mover). The basis for repeatedly digging in tanks is cited in a quote from that study.

> "The demand for protected fighting positions has been overwhelmingly established in other studies. US doctrine which has evolved not only from study results but also from war experience tells the combined force to fight dug in. The M-9 provides the combined arms with a unique capability to prepare hull down positions."

Fundamental to this concept of digging successive fighting positions for the tank is an apparent gain in probability of kill (P_k) of the dug in tank over his open mobile opponent. The graphs in Figure 7 developed unpublished weapon systems data developed by Lawrence Livermore Laboratory, illustrate the point.

The delta between curve 1 and 2 indicates the dug-in M-1 tank has a kill advantage over the T-72 tank when the T-72 is open and mobile. If both are open and mobile, the advantage reverses as indicated by the delta between curves 2 and 3.

If priority of protection should go to the direct fire force, as suggested by the USAES study, there exists an apparent survivability priority conflict between the tactical nuclear and conventional environments. This has significant engineer planning implications for the integrated environment, which may change from conventional to nuclear or chemical without warning.

During our discussions with US and Israeli officers at the US Army War College and the Command and General Staff College, we found almost unanimous disagreement with the concept of digging in tanks in other than the initial, or primary, battle positions. On the other hand, there is concensus on successively digging in the Improved TOW Vehicle systems (ITV's), because of their vulnerability and the need for these positions to be selected for area coverage. Conversely, we found an equally strong concensus for giving priority of engineer effort to terrain enhancement, i.e., obstacles to create barriers to delay and canalize the attacking force. Intuitive arguments against digging

in the tank include: degradation of precision target acquisition capability while stationary in a hole, the potential for enemy detection of pre-dug positions, and the overall limitations imposed by such a concept on freedom of action. These officers argued that, in the dynamics of a tank battle, mobility and tactical creativity by audacious tank commanders to develop and exploit short term favorable force ratios intuitively offer greater chance for success than a defensive "set piece" battle tied to preplanned, successive, stationary, fighting positions. The following excerpts from the book, The Yom Kippur War, lend support to their argument:

> "Tank fighting is more like a kind of brutal chess match in which the contestants maneuver to find temporary static positions of advantage from which they can deliver sudden and unanswerable blows."
>
> "The chief skill of a tank commander leading a squadron into battle is to use such minor wrinkles in the terrain - the "dead ground" - to reach an attacking position without detection by the enemy. Ideally, he and his squadron can then loom suddenly above the skyline like red Indians in a movie, fire a swiftly destructive volley, and slide back out of sight."

The advantages of cover and concealment are obvious. The idea of repeatedly digging in tanks, however, does not follow. FM 100-5 cites the importance of cover and concealment, but also indicates mobility as the key to survival. There is no mention of repeatedly digging in tanks.

From an engineer standpoint, the impact of digging in successive battle positions is overwhelming. A quick calculation places the problem in perspective:

> A tank heavy, battalion task force of 37 tanks and 6 Improved TOW Vehicles (ITV's) is supported by 2 D7 dozers (or M9 Armored Combat Earthmover when this system is fielded). Assuming (1) 30% natural defilade and 20 minutes to dig each hole, the time required to dig in the entire TF (without supplemental positions) is 5 hours!

(1) Assumptions same as those used in the previously cited M9 Effectivness Analysis.

It is highly unlikely that any thoughtful maneuver commander plans to remain in position for 5 hours. Such an engagement would not only be decisive, but probably unfavorable, given the opposing force numerical superiority which could be established by the arrival of the second echelon. The normal complement of digging support simply cannot keep pace, even if such a concept were viable. A realistic duration, say one hour, would require 10 earthmovers. With other competing demands for limited engineer resources, this too, is not feasible.

Because of the conflict of professional opinions, that of the Engineer School (M9 Analysis) for priority to repeatedly digging in tanks versus that of our armor colleagues for priority to terrain enhancement to support maneuver, our approach for the conventional environment became that of attempting to evaluate the relative payoff (in terms of survivability) of digging in versus employment of obstacles. This, in effect, became a comparative effects determination of survivability (preparing protective emplacements) versus countermobility (employment of obstacles) for the conventional environment.

Approach

Battlefield Simulation

In an effort to gain some insight into the relative value of countermobility versus survivability as combat multipliers, a battlefield simulation was conducted using the JANUS model at the Lawrence Livermore National Laboratory in Livermore, California. JANUS is an event driven, stochastic model, which approximates real time. Forces are modeled by weapons systems. Direct fire engagements occur automatically when opposing forces close to within range and when line-of-sight acquisition is possible. Indirect fire

and maneuver are player controlled, although weapons effects and movement rates are affected by many parameters modeled by the input code to the war game. JANUS's high resolution is particularly useful in modeling small unit battle outcomes.

The scenario, designed to duplicate the same conditions used in the Engineer School's M9 analysis, had a Blue, tank heavy, battalion task force defending against a Red tank regiment. Organization and weapons systems of the Blue and Red forces are shown in Figures 8 and 9 respectively. Systems currently available to JANUS are the M-60A1 and T62. Upgrade to the M1 and T72 would not be expected to have significant impact on outcome due to incremental improvements in both systems.

Indirect fire was not included, since the objective was to isolate and evaluate the relative effects of Blue digging in versus Red countermobility delay due to obstacles.

The area northeast of Hünfeld in the greater Fulder Gap region was selected to model the outcome of various scenarios of the constant force composition. Red avenues of approach, Blue disposition in primary positions and withdrawal routes into secondary positions are depicted in Figure 10.

Three scenarios were modeled on JANUS. Each scenario was iterated two times to proximate a statistical basis for data analysis. TAB A contains the data accumulated in the compilation of results from each scenario run. The first scenario involved a 5 minute Red delay at obstacles approximately 2500 meters in front of Blue's initial battle positions. Obstacles were placed on all Red axis of advance. All Blue tanks and TOW's were dug in.

The second scenario delayed Red at the same obstacles with Blue having 30 percent of his tanks and both of his TOW's dug in. This percentage cor-

responds to the M9 Effectiveness Analysis, which estimates that defilades of opportunity occur naturally on German terrain for 30 percent of the direct fire systems. Our evaluation of the Hünfeld terrain supports that at least 30 percent of the direct fire systems could locate in natural defilades.

The third scenario had no Red delay at any obstacles and all Blue direct fire system were dug in.

Losses, by type system, for both Red and Blue to each opposing force type system are available in the printouts at TAB A taken at three minute intervals. Data is synthesized in the development of the graphs which follow.

Shown on the graph at Figure 11 are Blue tank losses incurred in each scenario, plotted incrementally over time. Blue losses in both delay scenarios, through the duration of the delay, totaled four of the 35 tanks in the force. In the non-delay scenario, Blue lost 12 of 35 tanks and was bypassed by Red after only nine minutes of battle. This advancement rate of approximately 20 miles per hour may be slightly high due to the lack of artillery, air, etc., but clearly the time on battle positions will be measured in minutes, not hours, as suggested by the M9 analysis.

At Figure 12 the Loss Exchange Ratio - Red tank losses divided by Blue tank losses - are shown for the three scenarios. Initially, Blue did very well in both scenarios involving a Red delay at an obstacle. Red was forced to deploy from column to a battle formation allowing Blue to achieve, for a short time increment, numerical superiority on selected deploying Red units.

As Red deployed and began to move through the obstacle, Red's ability to acquire Blue targets with his greater numbers of direct fire systems dominated the relative P_k advantage of Blue being dug in as in Scenario 1. Red's relative

P_k advantage over Blue came into focus earlier in Scenario 2 once Red deployed to a combat formation and could bring a superior number of systems to focus on 70 percent of Blue's force not dug in.

In Scenario 3 where there was no Red delay, Red closed on Blue in battle formation, engaging with superior numbers of systems on relatively static, dug in, Blue systems. Although there was a relative Blue P_k advantage, Red's ability to acquire Blue at rapidly decreasing ranges with a 3:1 numerical superiority quickly degraded Blue's capability.

It should be noted these simulation results have the same limitations inherent in all models and should not be accepted as conclusive. There is, however, a clear indication that effective use of obstacles has a payoff potential equal to, or greater than, digging in tanks.

Mathematical Analysis

The previous results suggest a need to understand better the interaction between Red and Blue systems, as it is evident that battle outcome involves more than merely comparative P_k values. To investigate this interaction, an exchange of weapon fire can be modeled as a series of Bernoulli trials (a well-accepted assumption in modeling theory) over a time interval ΔT. The following mathematical relationships can then be developed to represent the situation of force ratio stability for forces in contact:

Expected losses by "Y" to "X" during ΔT:

$$E(Ly)_{\Delta T} = N_{x\,\Delta T} \cdot P_k \ (x \rightarrow y)$$

Where: $N_{x\,\Delta T}$ = Number rounds fired by x during ΔT

$P_{k(x \rightarrow y)}$ = Probability of kill x fires on y

To maintain constant force ratios:

$$E(Ly) = FR_{y/x} \cdot E(Lx)$$

Where: $FR_{y/x}$ = Force ratio, y to x.

Defining:

RPS_x = Average number of rounds per x system during ΔT

WS_x = Number x weapons systems entering ΔT

Therefore: $N_x = RPS_x \cdot WS_x$, and

$$RPS_x \cdot WS_x \cdot P_{k(x \rightarrow y)} = FR_{y/x} \cdot WS_y \cdot RPS_y \cdot P_{k(y \rightarrow x)}$$

leads to the Stability Equation:

$$\frac{RPS_x}{RPS_y} = (FR_{y/x})^2 \frac{P_{k(y \rightarrow x)}}{P_{k(x \rightarrow y)}}$$

The equation is an expression of expected value and, in this its simplest form, is applicable only to homogeneous opposing forces (e.g. all M1's vs all T72's). However, the expression remains valid for non-homogeneous forces (e.g. M1's/ITV's vs T72's/Sagger's) if P_k's are viewed as averaged over the rounds fired in ΔT and the components of force ratio weighted by weapon system accordingly.

Evident from this relationship is that over a realistic range of P_k ratios, the expected Blue LER improvement due to digging in will not compensate for a force ratio inferiority. For example, if Blue gains a 2 to 1 P_k advantage by digging in against a 3 to 1 superior Red force, each Blue system must still fire 4.5 rounds for every one fired by a Red system to merely break even; not an attractive situation for Blue. Imagine the Blue rounds per system in a 7 or 8 to 1 Red superiority. Simulation results indicating force ratio dominance over the relative P_k advantage are thus predictable from this mathematical relationship. Soviet doctrine of echelonment, which masses forces across a

narrow contact zone, is evidence of their appreciation of this dominance.

It is important to understand here, that for the numerically inferior defender to do better than stay even, he must achieve an LER greater than the ratio of forces in contact. If he does so repeatedly, the force ratio through higher opposing force attrition will converge in his favor. If he does not, the ratio will diverge in the attacker's favor. It is evident from the simulation results that digging in may eliminate the potential for creation of a "favorable" LER for the outnumbered defender.

Figure 13 depicts graphically the relationships of the stability equation. For three sample force ratios of 5:1, 3:1 and 1:1, and a range of probability of kill (P_k) ratios, sample impact on the rounds per system (RPS) ratio are analyzed. The source of this data, as that in Figure 7, is from Livermore Laboratory. Delta-1 ($\Delta 1$) shows the improvement in the RPS ratio that can be achieved by digging into hull defilade the 3:1 outnumbered defender's tanks at 2000 meters. The attacking T72 is always open and mobile. If both XM1 and T72 are open and mobile the P_k ratio (from Figure 7) is approximately 2. From Figure 13 (and the stability equation) we see that each outnumbered defenders tank must fire 18 rounds for each tank of the numerically superior attacker. By digging in the defender reduces the P_k ratio to approximately 0.8 and the RPS ratio to 7.2. If, however, the defender could have temporarily reduced the force ratio to 1:1, he could have reduced the RPS ratio to 2. This example illustrates the dominance of the force ratio over the P_k ratio.

If, through employment of obstacles to canalize the attacker into piecemeal advancement and maneuver by defender, a force ratio reduction from 3:1

to 1:1 can be achieved. Delta-2 represents the favorable RPS ratio change that can be achieved. In this example, where a P_k ratio of unity is assumed (opposing tanks systems are equal), a favorable RPS ratio change of 9:1 to 1:1 is achieved. This delta represents a hypothetical improvement created by countermobility employment of engineer resources, i.e., emplacement of obstacles.

Delta-3 and Delta-4 illustrate the advantages of digging in the improved TOW vehicle (ITV) against the attacking T72 at 2000 and 3000 meters respectively. Both examples assume a 3:1 attacker superiority. The advantage of engaging at long range with the ITV is obvious.

From the preceding discussion, the key to success for the outnumbered defender is apparent. The answer lies in the mathematical relationships of force ratios described earlier. An attacker's force superiority can only be overcome if the defender kills in the zone of contact faster than the attacker can mass. Barriers delay the attacker at ranges where the defender's high P_k ATGM systems are most effective. Barriers also canalize the attacker into piecemeal advancement so that defending tanks can maneuver and mass, then use defilades of opportunity to surprise and destroy the confused and temporarily outgunned attacker. These quick, violent counterattacks by the defender also permit ATGM disengagement and repositioning to again maximize their unique P_k-range advantage. Defender's tanks then break contact before the attacker can reinforce and decisively engage. When barriers cause significant attacker massing, conventional and nonconventional artillery should be employed for maximum effectiveness.

The following comment appeared in the August 1980 issue of Military Review:

> "The role of the combat engineers is not generally understood. 'Barrier and maneuver' must be an operational axiom. Effective barriers permit maneuver. Barriers allow us to hold certain areas on the battlefield with relatively light forces and make it possible for us to mass overwhelming combat power at a critical point of decision where we have the advantage."

Survivability by itself has little utility if the opposing force is not being killed at a highly favorable rate. The importance of barriers suggested by the above quote is supported by the simulation results and the mathematical analysis.

The conclusion of this portion of the study is that intuitive arguments against digging in tanks can be supported by battlefield simulation results and mathematical analysis. The need for defilades of opportunity should not be misconstrued as a requirement to dig successive fighting positions for tanks. To maximize the combat multiplier of engineer resources, employment plans should consider: (1) protective emplacements for indirect fire systems and ATGM's instead of tanks; and (2) terrain enhancement (barriers) to support maneuver.

CONCLUSIONS

In order to understand better the allocation of combat engineer effort to the maneuver force analysis of payoffs is best done from the client or user perspective rather than from an aggregation of functional task workload on an area basis. Using the methodology described in this study allows for allocation of effort decisions geared to maximize the payoff to the user. The technique lends itself naturally to development of doctrine and organization for engineer combat support in the integrated environment. This is not true of the functional area approach.

Survivability in a nuclear environment is a key and critical engineer task. Indirect fire systems such as artillery and soft direct fire systems such as the ITV should receive priority engineer support to enhance the probabilities of survival in a nuclear environment. This priority does not conflict with engineer support demands for the conventional environment. Given limited engineer resources, the understanding of these concepts is essential to permit maximization of the engineer combat multiplier to the combined arms team.

Additional emphasis is needed on the synthesis of nuclear weapons effects data. As shown in the study, such synthesis can be used to evaluate weapon system vulnerabilities and lead to development of a tactical nuclear doctrine. A major concern of the authors is the apparent inability of the engineer community to address the tactical nuclear doctrine issue. This was evident at the DA SPR, during which there was only a single minor reference to the integrated environment.

In the nuclear environment the mobility requirement for engineer resources is selective, by type supported unit. Although the effects of rubbling,

tree blowdown, etc. will be significant, demands for engineer resources can be analyzed and prioritized using a client approach.

In the convetional environment, the countermobility payoff is at least equal to, and probably greater than, the engineer survivability effort to the maneuver force.

There is a need for additional "client analyses" to fully understand optimum allocation of engineer resources in an integrated environment.

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300KT AIRBURST

UNIT	DIST FROM "GZ"	POSTURE	PERSONNEL STATUS			EQUIPMENT STATUS					
			DEATH CRITICAL	MISSION IMPAIRED	MISSION CAPABLE	M577/548			M109		
						OP	UR	L	OP	UR	L
155 BTY	1800	NDI	35%	43%	22%	0	0	7	0	4	2
		DI	17	46	37	3	4	0	3	3	0
	2100	NDI	35	35	30	0	0	7	1	4	1
		DI	17	17	66	5	2	0	4	2	0
	2600	NDI	20	23	57	3	4	0	3	3	0
		DI	9	9	82	6	1	0	5	1	0

DI- DUG IN
NDI- NOT DUG IN
OP- OPERATIONAL
UR- UNIT REPAIRABLE
L- MISSION LOSS

FIGURE 1

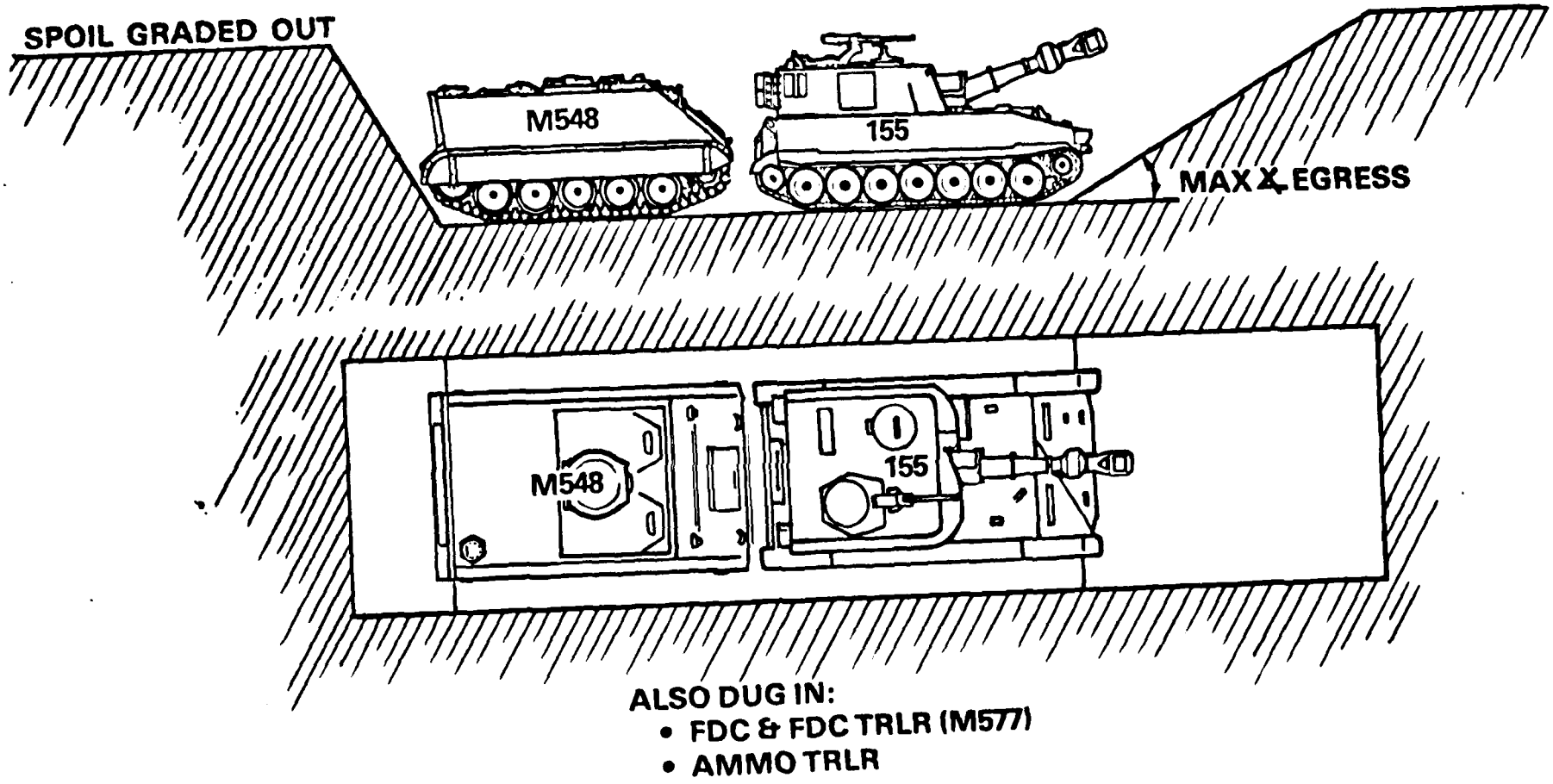

SPOIL GRADED OUT
M548
155
MAX ∡ EGRESS
M548
155
ALSO DUG IN:
• FDC & FDC TRLR (M577)
• AMMO TRLR

FIGURE 2

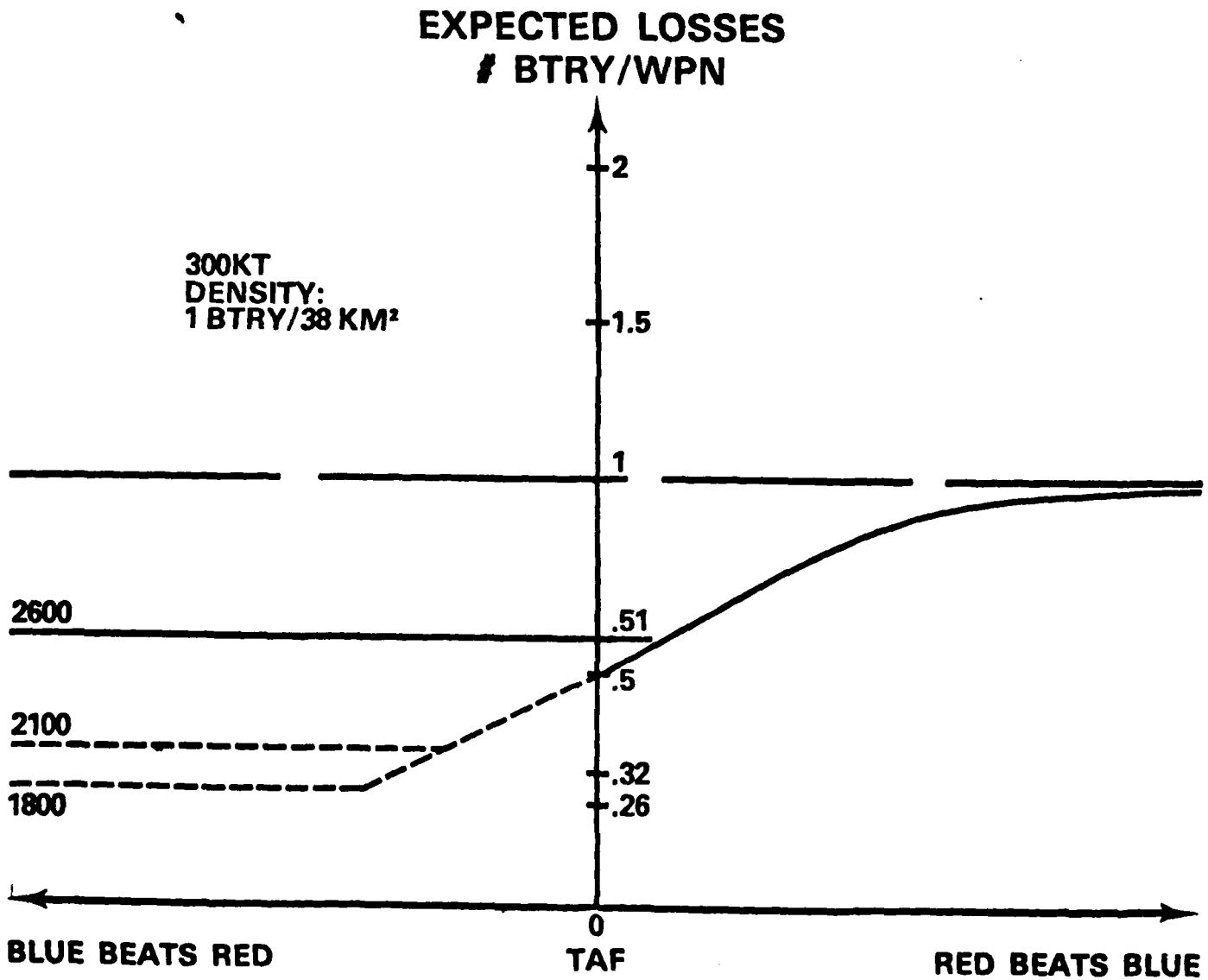

EXPECTED LOSSES
BTRY/WPN
300KT
DENSITY:
1 BTRY/38 KM²
2
1.5
1
2600
.51
.5
2100
.32
1800
.26
0
BLUE BEATS RED
TAF
RED BEATS BLUE

FIGURE 3

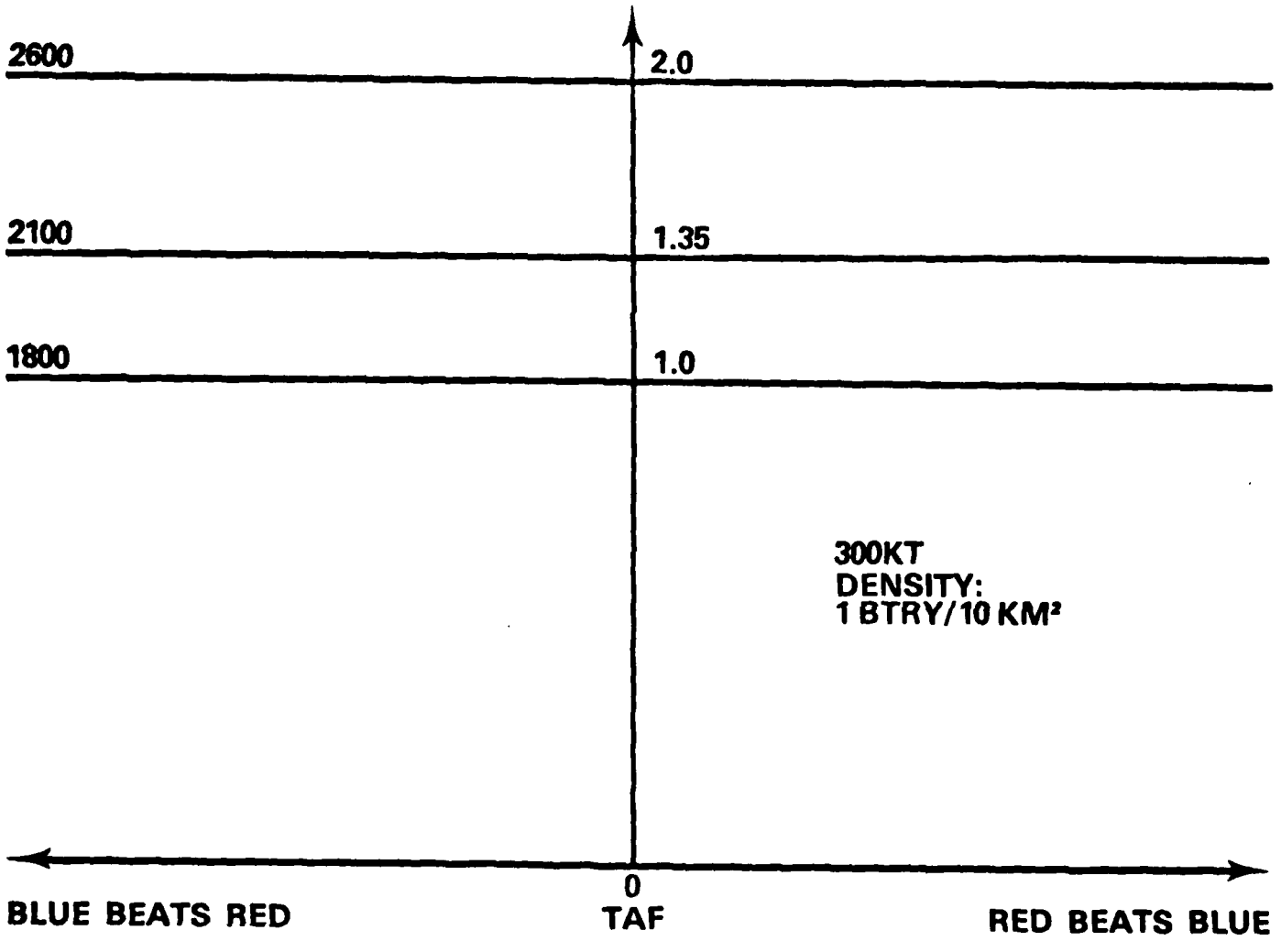

EXPECTED LOSSES
BTRY/WPN
2600
2.0
2100
1.35
1800
1.0
300KT
DENSITY:
1 BTRY/10 KM²
0
BLUE BEATS RED
TAF
RED BEATS BLUE

FIGURE 4

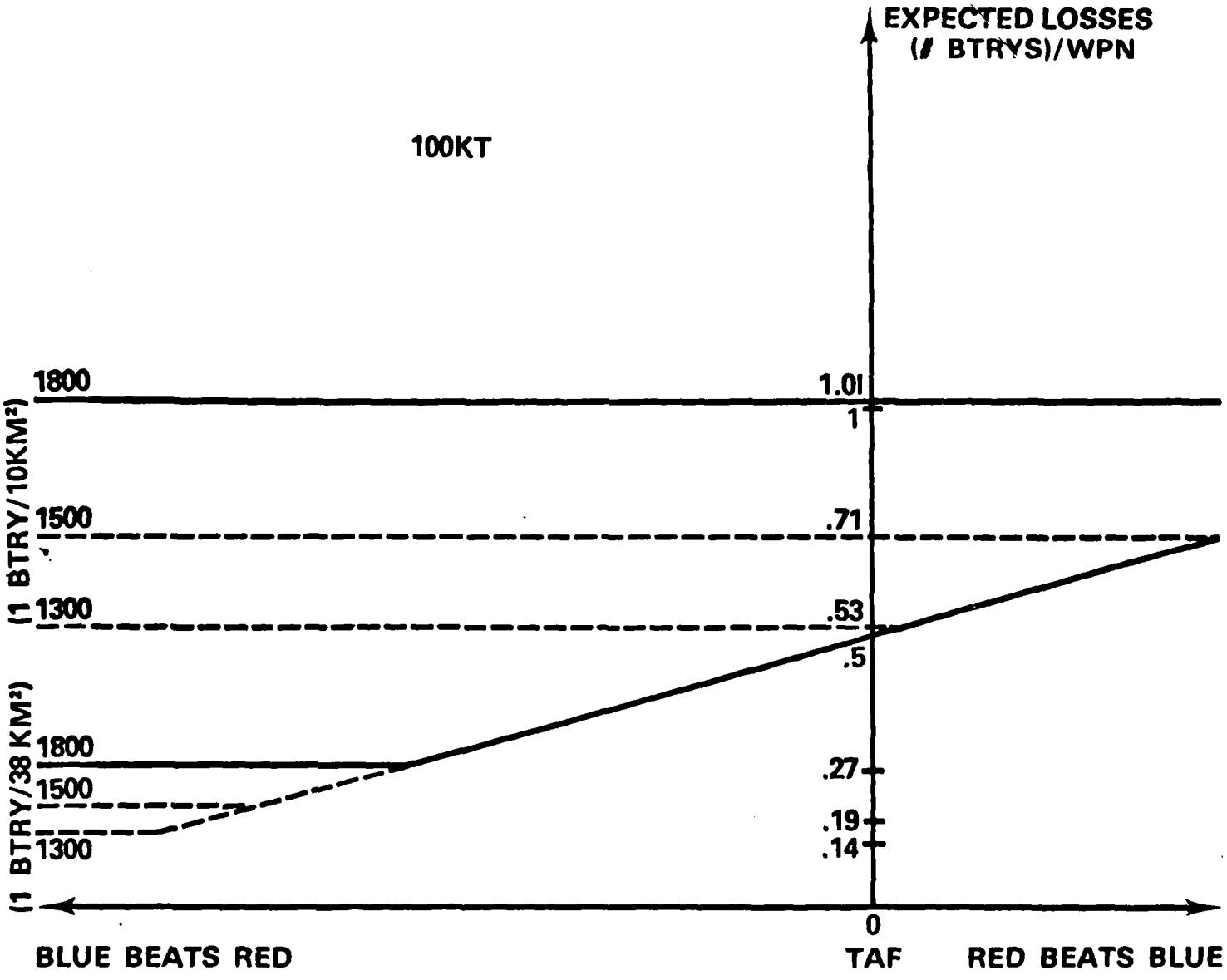

EXPECTED LOSSES
(# BTRYS)/WPN
100KT
1800
1500
1300
(1 BTRY/10KM²)
1800
1500
1300
(1 BTRY/38 KM²)
1.01
1
.71
.53
.5
.27
.19
.14
0
BLUE BEATS RED
TAF
RED BEATS BLUE

FIGURE 5

RADIOACTIVE DECAY VS MOBILITY

VEHICLE TYPE	YIELD (KT)	STARTING POINT[1] (FROM G2 IN KM)	10 KM/HV		40 KM/HV[2]	
			MAX DOSE (RAD)	DELAY (MIN)	MAX DOSE (RAD)	DELAY (MIN)
APC →	1	.66	14	0	30	0
	10	.97	151	1	270	1
	100	1.36	370	3	520	5
	300	1.53	455	6	600	10

1/ CLOSEST DISTANCE APC & CREW SURVIVES
2/ WORST CASE

FIGURE 6

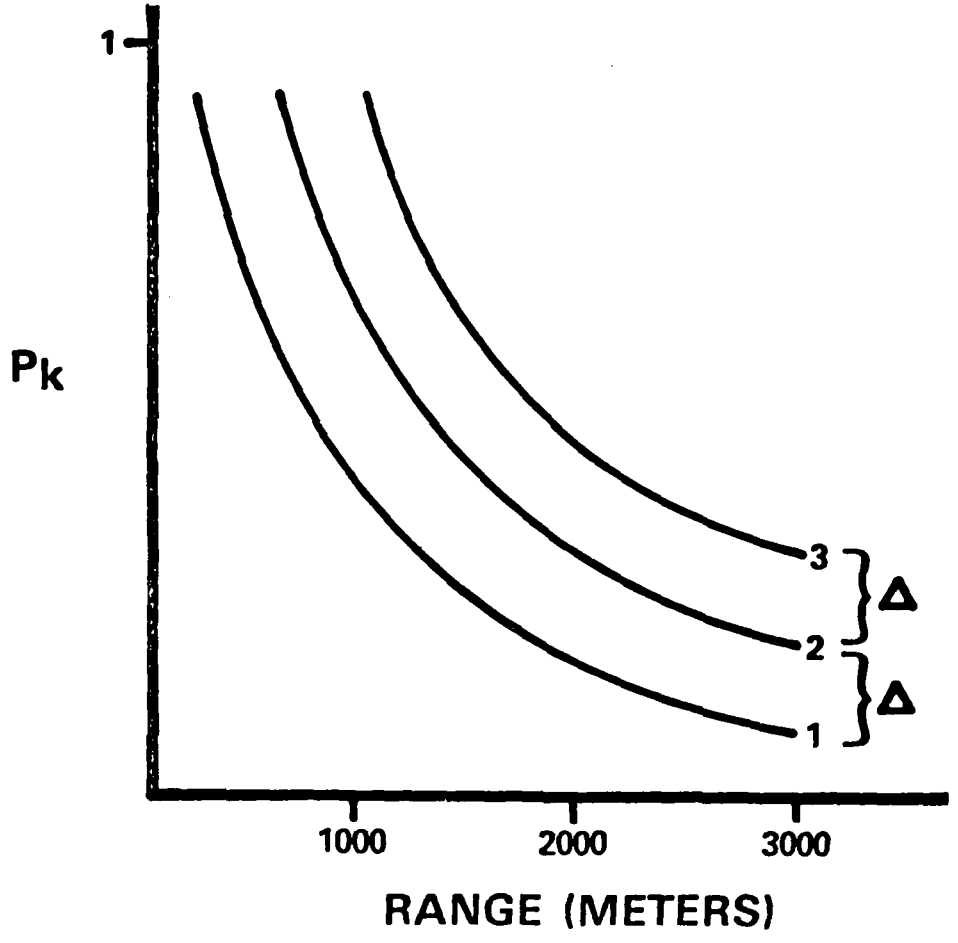
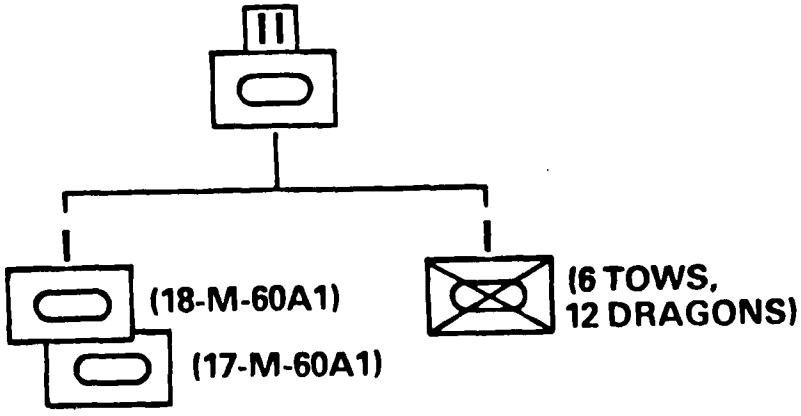


FIGURE 7

BLUE BATTALION TASK FORCE



	TOTAL	M-60A1	TOWS	DRAGONS
WEAPON SYSTEMS:		35	6	12

FIGURE 8

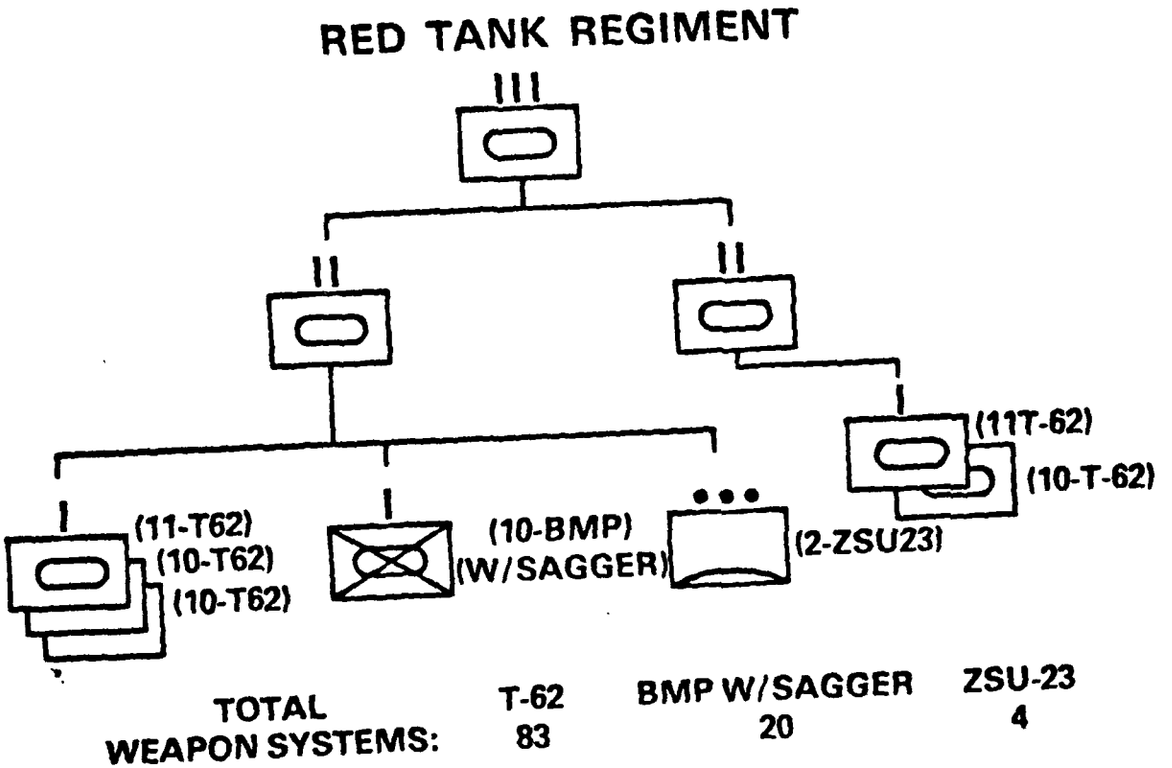

RED TANK REGIMENT
(11T-62)
(10-T-62)
(11-T62)
(10-T62)
(10-T62)
(10-BMP)
(W/SAGGER)
(2-ZSU23)
TOTAL WEAPON SYSTEMS:
T-62
83
BMP W/SAGGER
20
ZSU-23
4

FIGURE 9

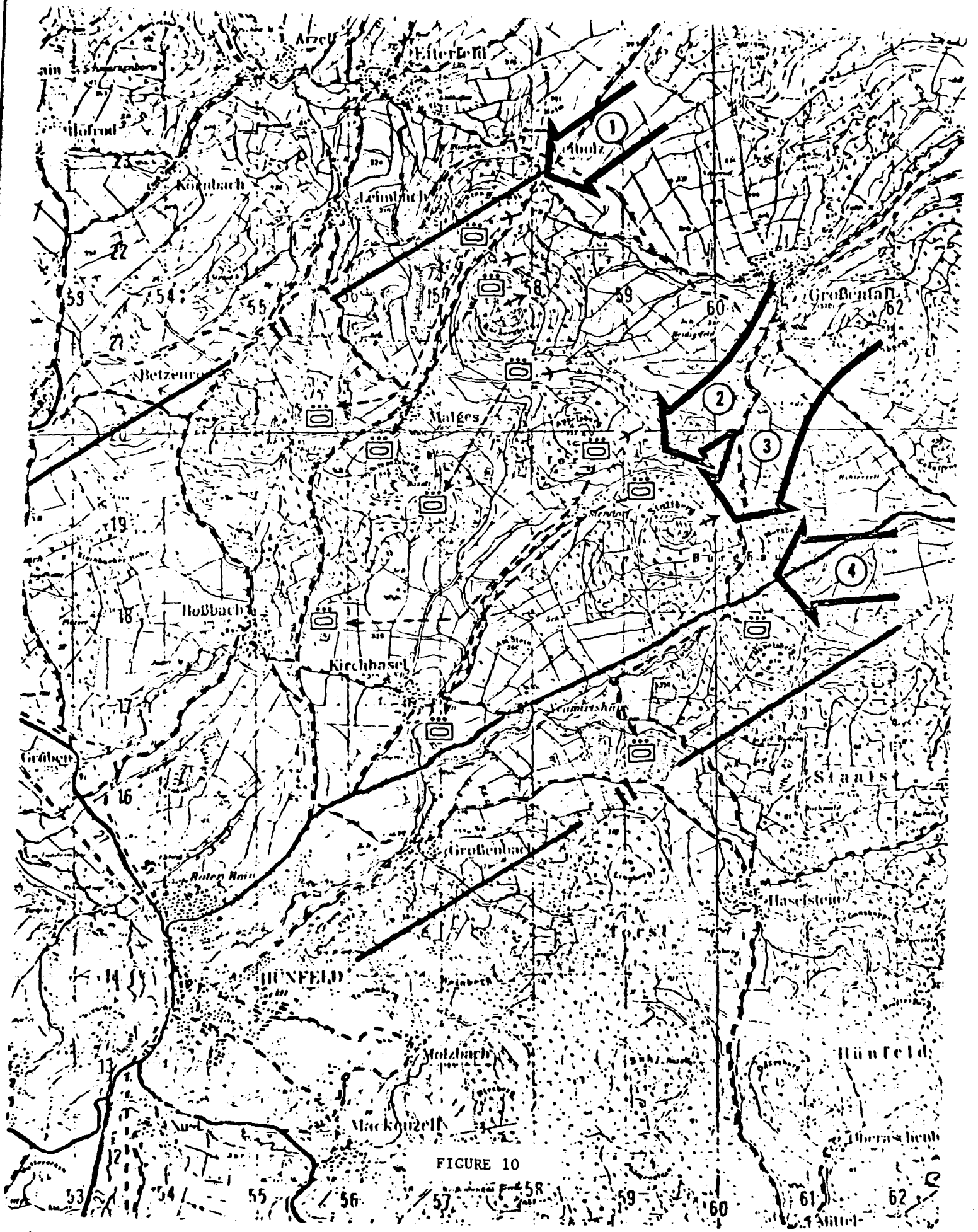

1
2
3
4
Malgés
Kirchhasel
Großenbaum
Staats
Haselstein
HUNFELD
Molzbach
Mackenzell
Hünfeld

FIGURE 10

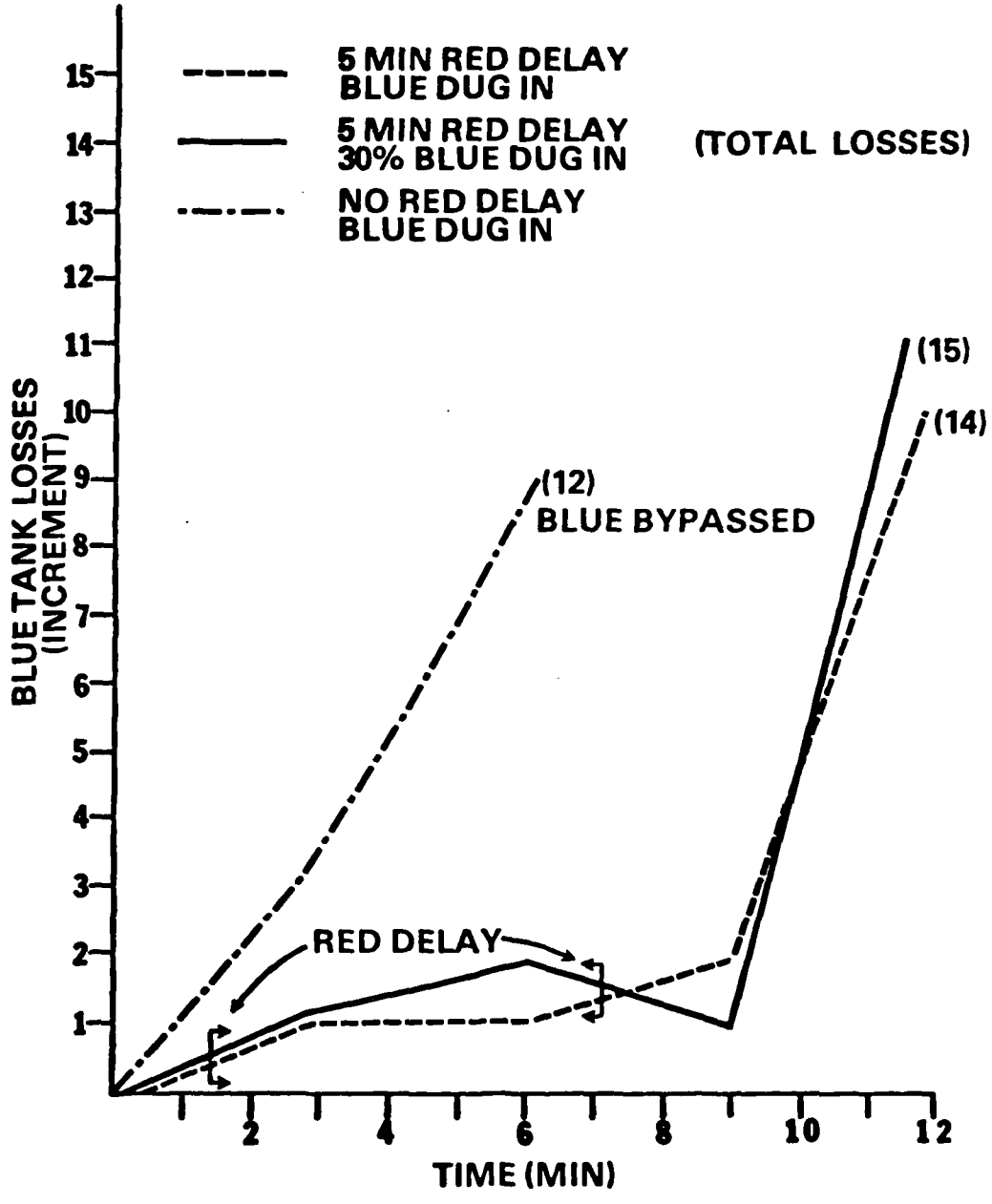

JANUS WARGAME
5 MIN RED DELAY
BLUE DUG IN
5 MIN RED DELAY
30% BLUE DUG IN
(TOTAL LOSSES)
NO RED DELAY
BLUE DUG IN
BLUE TANK LOSSES
(INCREMENT)
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
(15)
(14)
(12)
BLUE BYPASSED
RED DELAY
2
4
6
8
10
12
TIME (MIN)

FIGURE 11

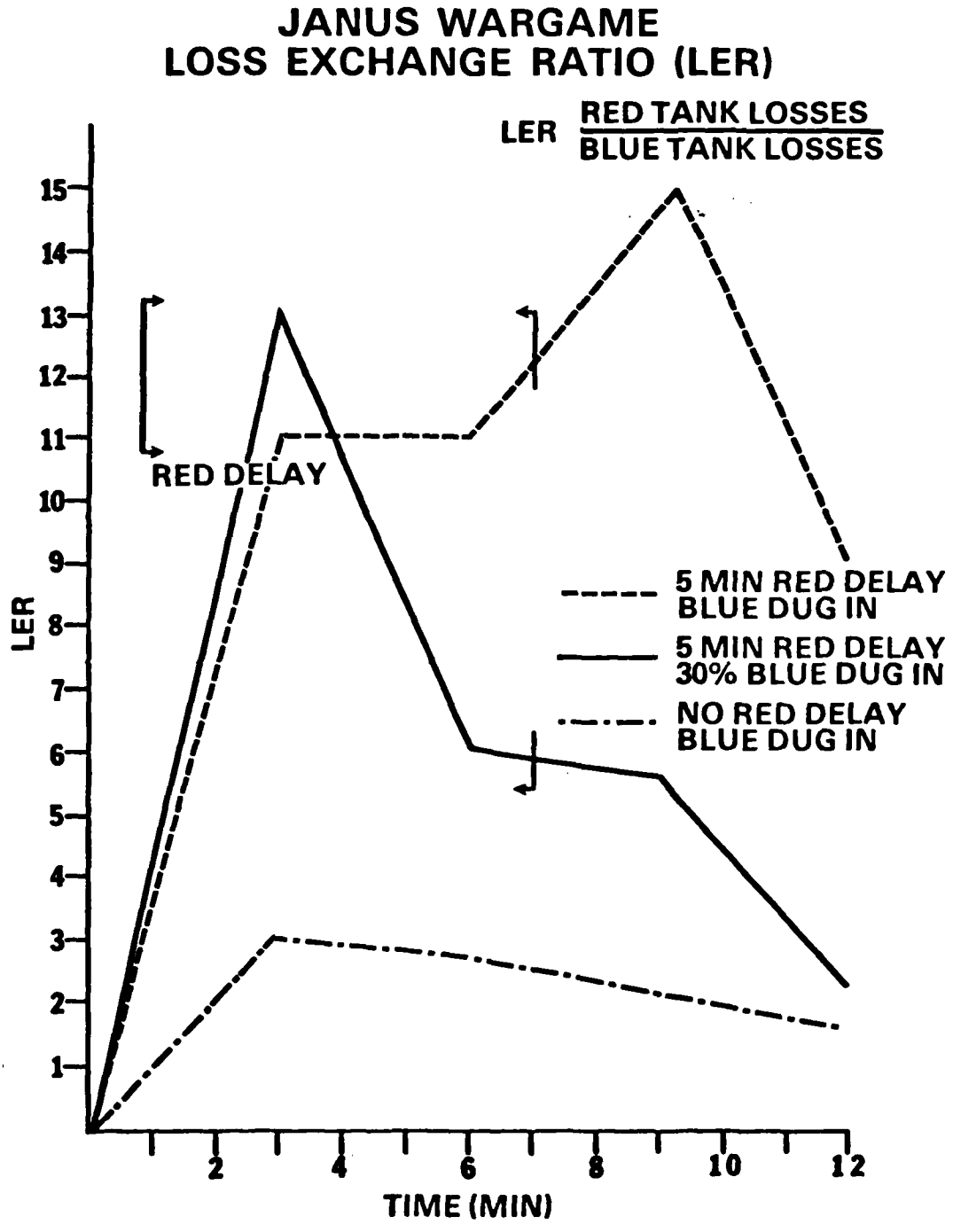

JANUS WARGAME
LOSS EXCHANGE RATIO (LER)
LER RED TANK LOSSES / BLUE TANK LOSSES
LER
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
RED DELAY
5 MIN RED DELAY
BLUE DUG IN
5 MIN RED DELAY
30% BLUE DUG IN
NO RED DELAY
BLUE DUG IN
2
4
6
8
10
12
TIME (MIN)

FIGURE 12

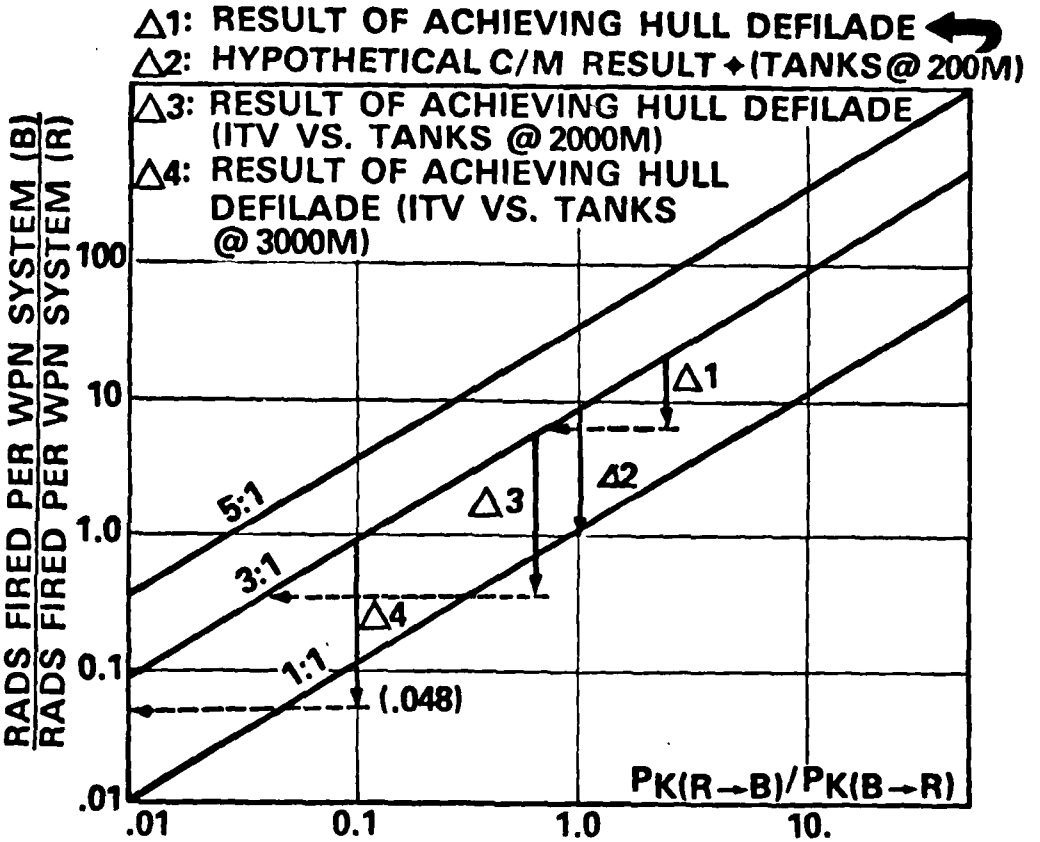

Δ1: RESULT OF ACHIEVING HULL DEFILADE
Δ2: HYPOTHETICAL C/M RESULT ✦ (TANKS @ 200M)
Δ3: RESULT OF ACHIEVING HULL DEFILADE (ITV VS. TANKS @ 2000M)
Δ4: RESULT OF ACHIEVING HULL DEFILADE (ITV VS. TANKS @ 3000M)
RADS FIRED PER WPN SYSTEM (B) / RADS FIRED PER WPN SYSTEM (R)
100
10
1.0
0.1
.01
5:1
3:1
1:1
Δ1
Δ2
Δ3
Δ4
(.048)
PK(R→B)/PK(B→R)
.01
0.1
1.0
10.

FIGURE 13

Run 1 - 5 Min Delay

SIMULATION TIME: 0.00

TOTAL	SYSTEM	BLUE	RED
	TANK	68	399
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	318	754
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 754	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

TAB A

SIDE GROUP UNIT X Y SYSTEM ELEM LOSS ROUND KILO RADS RAD LEVEL [illegible]

SIMULATION TIME: 14.00

TOTAL	SYSTEM	BLUE	RED
	TANK	55	366
	ATGM	131	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	293	721
RESERVES		124	219

STATUS OF SURVIVING FORCES

293	721	TOTAL RAD SAFE
0	0	TOTAL LATENT
0	0	TOTAL FUNC IMP
0	0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	4	9	0	0	0	0	0
ATGM	9	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	13	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	20	13	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	20	13	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 13.00

TOTAL	SYSTEM	BLUE	RED
	TANK	55	366
	ATGM	131	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	293	721
RESERVES		124	219

STATUS OF SURVIVING FORCES

293 721	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	4	9	0	0	0	0	0
ATGM	9	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	13	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	20	13	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	20	13	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 12.00

TOTAL	SYSTEM	BLUE	RED
	TANK	55	366
	ATGM	131	123
	AIR	21	12
	NUCLAR	64	183
	TOTAL	293	721
RESERVES		124	219

STATUS OF SURVIVING FORCES

293	721 TOTAL RAD SAFE
0	0 TOTAL LATENT
0	0 TOTAL FUNC IMP
0	0 TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	4	9	0	0	0	0	0
ATGM	9	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	13	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	20	13	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	20	13	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 11.00

TOTAL	SYSTEM	BLUE	RED
	TANK	55	366
	ATGM	131	123
	AIR	21	12
	NUCLAR	64	138
	TOTAL	293	721
RESERVES		124	219

STATUS OF SURVIVING FORCES

293 721	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	4	9	0	0	0	0	0
ATGM	9	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	13	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	20	13	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	20	13	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

```
SIMULATION TIME:  10.00
TOTAL          SYSTEM          BLUE   RED
                TANK             55 366
                ATGM            134 123
                AIR              21  12
                NUCLAR           64 188
                TOTAL           296 721
RESERVES                        124 219
STATUS OF SURVIVING FORCES
 296 721     TOTAL RAD SAFE
   0   0     TOTAL LATENT
   0   0     TOTAL FUNC IMP
   0   0     TOTAL INCAPAC
  CAUSE OF ATTRITION
  BLUE KILLED BY RED

SYSTEM          TANK    ATGM    CHEM    ARTY    BURN    BLAST   RAD

TANK             4       9       0       0       0       0       0
ATGM             6       3       0       0       0       0       0
AIR              0       0       0       0       0       0       0
NUCLAR           0       0       0       0       0       0       0
TOTAL           10      12       0       0       0       0       0
  TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS    0

  TOTAL KT EXPENDED BY SIDE  2 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  2 :    0

  RED KILLED BY BLUE

SYSTEM          TANK    ATGM    CHEM    ARTY    BURN    BLAST   RAD

TANK            20      13       0       0       0       0       0
ATGM             0       0       0       0       0       0       0
AIR              0       0       0       0       0       0       0
NUCLAR           0       0       0       0       0       0       0
TOTAL           20      13       0       0       0       0       0
  TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS    0

  TOTAL KT EXPENDED BY SIDE  1 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  1 :    0

CITY SML-FIRE      0 CITY LGE-FIRE      0 HECT
CITY SML-BDN       0 CITY LGE-BDN       0 HECT
```

SIMULATION TIME: 9.00

TOTAL	SYSTEM	BLUE	RED
	TANK	59	367
	ATGM	135	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	301	722
RESERVES		124	219

STATUS OF SURVIVING FORCES

301 722	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	4	5	0	0	0	0	0
ATGM	5	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	9	8	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	19	13	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	19	13	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 8.00

TOTAL	SYSTEM	BLUE	RED
	TANK	61	370
	ATGM	140	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	308	725
RESERVES		124	219

STATUS OF SURVIVING FORCES

308 725	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	4	0	0	0	0	0
ATGM	3	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	6	4	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	19	10	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	19	10	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 7.00

TOTAL	SYSTEM	BLUE	RED
	TANK	64	378
	ATGM	142	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	313	733
RESERVES		124	219

STATUS OF SURVIVING FORCES

313	733	TOTAL RAD SAFE
0	0	TOTAL LATENT
0	0	TOTAL FUNC IMP
0	0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	2	2	0	0	0	0	0
ATGM	1	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	3	2	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	13	8	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	13	8	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 6.00

TOTAL	SYSTEM	BLUE	RED
	TANK	64	381
	ATGM	142	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	313	736
RESERVES		124	219

STATUS OF SURVIVING FORCES

313 736	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	2	2	0	0	0	0	0
ATGM	1	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	3	2	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	13	5	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	13	5	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

```
SIMULATION TIME:   5.00
TOTAL          SYSTEM          BLUE   RED
                TANK             68 387
                ATGM            143 123
                AIR              21  12
                NUCLAR           64 182
                TOTAL           318 742
RESERVES                        124 219
STATUS OF SURVIVING FORCES
 318 742     TOTAL RAD SAFE
   0   0     TOTAL LATENT
   0   0     TOTAL FUNC IMP
   0   0     TOTAL INCAPAC
  CAUSE OF ATTRITION
  BLUE KILLED BY RED

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK              0       0       0      0       0       0      0
ATGM              0       0       0      0       0       0      0
AIR               0       0       0      0       0       0      0
NUCLAR            0       0       0      0       0       0      0
TOTAL             0       0       0      0       0       0      0
  TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  2 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  2 :    0


  RED KILLED BY BLUE

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK              8       4       0      0       0       0      0
ATGM              0       0       0      0       0       0      0
AIR               0       0       0      0       0       0      0
NUCLAR            0       0       0      0       0       0      0
TOTAL             8       4       0      0       0       0      0
  TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  1 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  1 :    0


CITY SML-FIRE      0 CITY LGE-FIRE      0 HECT
CITY SML-BDN       0 CITY LGE-BDN       0 HECT
```

SIMULATION TIME: 4.00

TOTAL	SYSTEM	BLUE	RED
	TANK	68	392
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	318	747
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 747	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	6	1	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	6	1	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 3.00

TOTAL	SYSTEM	BLUE	RED
	TANK	68	395
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	318	750
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 750	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	1	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	3	1	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 2.00

TOTAL	SYSTEM	BLUE	RED
	TANK	68	396
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	318	751
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 751	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	2	1	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	2	1	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

```
SIMULATION TIME:   1.00
TOTAL          SYSTEM          BLUE   RED
                TANK             68 399
                ATGM            143 123
                AIR              21  12
                NUCLAR           64 188
                TOTAL           318 754
RESERVES                        124 219
STATUS OF SURVIVING FORCES
 318 754     TOTAL RAD SAFE
   0   0     TOTAL LATENT
   0   0     TOTAL FUNC IMP
   0   0     TOTAL INCAPAC
  CAUSE OF ATTRITION
  BLUE KILLED BY RED

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK              0       0       0      0       0       0       0
ATGM              0       0       0      0       0       0       0
AIR               0       0       0      0       0       0       0
NUCLAR            0       0       0      0       0       0       0
TOTAL             0       0       0      0       0       0       0
  TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  2 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  2 :    0


  RED KILLED BY BLUE

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK              0       0       0      0       0       0       0
ATGM              0       0       0      0       0       0       0
AIR               0       0       0      0       0       0       0
NUCLAR            0       0       0      0       0       0       0
TOTAL             0       0       0      0       0       0       0
  TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  1 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  1 :    0


CITY SML-FIRE      0 CITY LGE-FIRE      0 HECT
CITY SML-BDN       0 CITY LGE-BDN       0 HECT
```

S ULATION TIME: 24.03

TL AL SYSTEM	BLUE	RED
TANK	40	341
ATGM	125	109
AIR	21	12
NUCLAR	64	182
TOTAL	272	674
RESERVES	124	219

STATUS OF SURVIVING FORCES

272, 674	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	23	5	0	0	0	0	0
ATGM	13	4	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	36	9	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	39	19	0	0	0	0	0
ATGM	14	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	6	0	0	0	0	0
TOTAL	55	27	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

Run 2
5 min
1 min Delay

-28 T
-17 AT

-58 T
14 AT

Check
again

SIMULATION TIME: 21.03

TOTAL	SYSTEM	BLUE	RED
	TANK	44	341
	ATGM	127	109
	AIR	21	12
	NUCLAR	64	182
	TOTAL	278	674
RESERVES		124	219

STATUS OF SURVIVING FORCES

278 674	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	19	5	0	0	0	0	0
ATGM	12	4	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	31	9	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	39	19	0	0	0	0	0
ATGM	14	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	6	0	0	0	0	0
TOTAL	55	27	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

-24 T
16 AT

58 T
14 AT

SIMULATION TIME: 18.03

TOTAL	SYSTEM	BLUE	RED
	TANK	51	349
	ATGM	127	119
	AIR	21	12
	NUCLAR	64	184
	TOTAL	285	694
RESERVES		124	219

STATUS OF SURVIVING FORCES

285 694	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	14	3	0	0	0	0	0
ATGM	12	4	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	26	7	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	31	19	0	0	0	0	0
ATGM	4	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	4	0	0	0	0	0
TOTAL	37	25	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

-17 T
-16 AT

-50 T
-4 AT

SIMULATION TIME: 15.03

TOTAL	SYSTEM	BLUE	RED
	TANK	53	352
	ATGM	128	119
	AIR	21	12
	NUCLAR	64	186
	TOTAL	288	701
RESERVES		124	219

STATUS OF SURVIVING FORCES

288 701	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	12	3	0	0	0	0	0
ATGM	11	4	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	23	7	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	31	16	0	0	0	0	0
ATGM	4	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	2	0	0	0	0	0
TOTAL	35	18	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

-15 T
-15 ATGM

- 47
- 4 ATGM

SIMULATION TIME: 12.03

TOTAL	SYSTEM	BLUE	RED
	TANK	68	372
	ATGM	136	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	311	727
RESERVES		124	219

STATUS OF SURVIVING FORCES

311 727	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	7	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	7	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	19	8	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	19	8	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

0 T
7 ATGM

27 T
0 ATGM

SIMULATION TIME: 9.03

TOTAL	SYSTEM	BLUE	RED
	TANK	65	368
	ATGM	142	122
	AIR	21	12
	NUCLAR	64	198
	TOTAL	314	720
RESERVES		124	219

STATUS OF SURVIVING FORCES

314 720	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	0	0	0	0	0	0
ATGM	1	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	4	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	15	16	0	0	0	0	0
ATGM	0	1	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	17	19	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

-3
-1 AT

-31T
-1 AT

SIMULATION TIME: 9.03

TOTAL	SYSTEM	BLUE	RED
	TANK	68	372
	ATGM	139	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	314	727
RESERVES		124	219

STATUS OF SURVIVING FORCES

314 727	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	4	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	4	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	19	8	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	19	8	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

-0 T
-4 ATGM

-27 T
0 ATGM

SIMULATION TIME: 6.03

TOTAL	SYSTEM	BLUE	RED
	TANK	68	377
	ATGM	141	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	316	732
RESERVES		124	219

STATUS OF SURVIVING FORCES

316 732	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	2	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	2	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	19	3	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	19	3	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

0 T
2 ATGM

22 T
0 ATGM

SIMULATION TIME: 3.01

TOTAL	SYSTEM	BLUE	RED
	TANK	68	391
	ATGM	142	123
	AIR	21	12
	NUCLAR	64	198
	TOTAL	317	746
		124	219

RESERVES
STATUS OF SURVIVING FORCES

317 746	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION
BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	1	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	1	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	(8)	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	8	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

Run 3
delay 1 5 min

0 T
1 ATGM

8 T

SIMULATION TIME: .01

TOTAL SYSTEM	BLUE	RED
TANK	68	399
ATGM	143	123
AIR	21	12
NUCLAR	64	188
TOTAL	318	754
	124	219

RESERVES
STATUS OF SURVIVING FORCES

318 754	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION
BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

Run 3
delay 1
5 & 1 min

Blue started move @
4:30

SIMULATION TIME: 24.00

TOTAL	SYSTEM	BLUE	RED
	TANK	37	343
	ATGM	131	109
	AIR	21	12
	NUCLAR	64	188
	TOTAL	275	680
RESERVES		124	219

STATUS OF SURVIVING FORCES

275 680	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	26	5	0	0	0	0	0
ATGM	6	5	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	32	10	0	0	0	0	4

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	42	14	0	0	0	0	0
ATGM	12	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	58	16	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

1

5 min Delay

30 % Defilade

TAB B

SIMULATION TIME: 21.00

TOTAL	SYSTEM	BLUE	RED
	TANK	43	343
	ATGM	131	111
	AIR	21	12
	NUCLAR	64	188
	TOTAL	281	684
RESERVES		124	219

STATUS OF SURVIVING FORCES

281 684	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	23	2	0	0	0	0	0
ATGM	6	5	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	29	7	0	0	0	0	2

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	42	14	0	0	0	0	0
ATGM	10	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	54	16	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 18.00

TOTAL	SYSTEM	BLUE	RED
	TANK	43	343
	ATGM	131	111
	AIR	21	12
	NUCLAR	64	188
	TOTAL	281	684
RESERVES		124	219

STATUS OF SURVIVING FORCES

281 684	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	23	2	0	0	0	0	0
ATGM	6	5	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	2
TOTAL	29	7	0	0	0	0	

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	42	14	0	0	0	0	0
ATGM	10	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	54	16	0	0	0	0	

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 15.00

TOTAL	SYSTEM	BLUE	RED
	TANK	43	345
	ATGM	133	113
	AIR	21	12
	NUCLAR	64	188
	TOTAL	283	690
RESERVES		124	219

STATUS OF SURVIVING FORCES

283 690	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	23	2	0	0	0	0	0
ATGM	4	5	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	27	7	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	40	14	0	0	0	0	0
ATGM	8	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	48	16	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 12.00

TOTAL	SYSTEM	BLUE	RED
	TANK	56	372
	ATGM	137	113
	AIR	21	12
	NUCLAR	64	188
	TOTAL	300	717
RESERVES		124	219

STATUS OF SURVIVING FORCES

300 717	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	10	2	0	0	0	0	0
ATGM	1	4	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	11	6	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	13	14	0	0	0	0	0
ATGM	8	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	21	16	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 9.00

TOTAL	SYSTEM	BLUE	RED
	TANK	62	375
	ATGM	139	121
	AIR	21	12
	NUCLAR	64	188
	TOTAL	308	728
RESERVES		124	219

STATUS OF SURVIVING FORCES

308 728	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	6	0	0	0	0	0	0
ATGM	1	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	7	3	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	10	14	0	0	0	0	0
ATGM	0	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	10	16	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 6.00

TOTAL	SYSTEM	BLUE	RED
	TANK	64	378
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	314	733
RESERVES		124	219

STATUS OF SURVIVING FORCES

314 733	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	4	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	4	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	10	11	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	10	11	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE	0	CITY LGE-FIRE	0 HECT
CITY SML-BDN	0	CITY LGE-BDN	0 HECT

SIMULATION TIME: 3.00

TOTAL	SYSTEM	BLUE	RED
	TANK	68	386
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	318	741
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 741	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

TAN
5 tanks killed

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	5	8	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	5	8	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 0.00

TOTAL	SYSTEM	BLUE	RED
	TANK	68	399
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	318	754
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 754	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	PAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 18.00

TOTAL	SYSTEM	BLUE	RED
	TANK	34	351
	ATGM	125	121
	AIR	21	12
	NUCLAR	64	183
	TOTAL	266	704
RESERVES		124	219

STATUS OF SURVIVING FORCES

266 704	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	28	6	0	0	0	0	0
ATGM	12	5	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	40	11	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	34	14	0	0	0	0	0
ATGM	1	1	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	35	15	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDM 0 CITY LGE-BDM 0 HECT

#2

5 min Delay
30% defilade

SIMULATION TIME: 15.00

TOTAL	SYSTEM	BLUE	RED
	TANK	35	353
	ATGM	125	122
	AIR	21	12
	NUCLAR	64	188
	TOTAL	267	707
RESERVES		124	219

STATUS OF SURVIVING FORCES

267 707	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	28	5	0	0	0	0	0
ATGM	12	5	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	40	10	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	32	14	0	0	0	0	0
ATGM	0	1	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	32	15	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

TIME: 12.00

SYSTEM	BLUE	RED
TANK	51	364
ATGM	132	122
AIR	21	12
NUCLAR	64	188
TOTAL	290	718
RESERVES	124	219

STATUS OF SURVIVING FORCES

290 718	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	13	4	0	0	0	0	0
ATGM	8	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	21	6	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	21	14	0	0	0	0	0
ATGM	0	1	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	21	15	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

SIMULATION TIME: 9.00

TOTAL	SYSTEM	BLUE	RED
	TANK	66	379
	ATGM	136	122
	AIR	21	12
	NUCLAR	64	188
	TOTAL	309	733
		124	219

RESERVES

STATUS OF SURVIVING FORCES

309 733	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	2	0	0	0	0	0	0
ATGM	5	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	7	2	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	9	11	0	0	0	0	0
ATGM	0	1	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	9	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIDE GROUP UNIT X Y SYSTEM ELEM LOSS ROUND KILO RADS RAD LEVEL

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SIMULATION TIME:   6.00
TOTAL          SYSTEM          BLUE   RED
                TANK             66 384
                ATGM            141 123
                AIR              21  12
                NUCLAR           64 188
                TOTAL           314 739
RESERVES                        124 219
STATUS OF SURVIVING FORCES
 314 739     TOTAL RAD SAFE
   0   0     TOTAL LATENT
   0   0     TOTAL FUNC IMP
   0   0     TOTAL INCAPAC
  CAUSE OF ATTRITION
  BLUE KILLED BY RED

SYSTEM          TANK    ATGM    CHEM    ARTY    BURN    BLAST   RAD

TANK              2       0       0       0       0       0       0
ATGM              2       0       0       0       0       0       0
AIR               0       0       0       0       0       0       0
NUCLAR            0       0       0       0       0       0       0
TOTAL             4       0       0       0       0       0       0
  TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  2 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  2 :    0


  RED KILLED BY BLUE

SYSTEM          TANK    ATGM    CHEM    ARTY    BURN    BLAST   RAD

TANK              9       6       0       0       0       0       0
ATGM              0       0       0       0       0       0       0
AIR               0       0       0       0       0       0       0
NUCLAR            0       0       0       0       0       0       0
TOTAL             9       6       0       0       0       0       0
  TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  1 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  1 :    0


CITY SML-FIRE      0 CITY LGE-FIRE      0 HECT
CITY SML-BDN       0 CITY LGE-BDN       0 HECT
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SIMULATION TIME:   3.00
TOTAL          SYSTEM          BLUE   RED
                TANK             67 387
                ATGM            141 123
                AIR              21  12
                NUCLAR           64 188
                TOTAL           315 742
RESERVES                        124 219
STATUS OF SURVIVING FORCES
 315 742     TOTAL RAD SAFE
   0   0     TOTAL LATENT
   0   0     TOTAL FUNC IMP
   0   0     TOTAL INCAPAC
  CAUSE OF ATTRITION
  BLUE KILLED BY RED

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK              1       0       0      0       0       0       0
ATGM              2       0       0      0       0       0       0
AIR               0       0       0      0       0       0       0
NUCLAR            0       0       0      0       0       0       0
TOTAL             3       0       0      0       0       0       0
  TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS    0

  TOTAL KT EXPENDED BY SIDE  2 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  2 :    0

  RED KILLED BY BLUE

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK              6       6       0      0       0       0       0
ATGM              0       0       0      0       0       0       0
AIR               0       0       0      0       0       0       0
NUCLAR            0       0       0      0       0       0       0
TOTAL             6       6       0      0       0       0       0
  TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS    0

  TOTAL KT EXPENDED BY SIDE  1 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  1 :    0

CITY SML-FIRE      0 CITY LGE-FIRE      0 HECT
CITY SML-BDN       0 CITY LGE-BDN       0 HECT
```

SIMULATION TIME: 0.00

TOTAL	SYSTEM	BLUE	RED
	TANK	68	399
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	318	754
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 754	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

#2
5 min Delay
30 Def 6-4

Run 1 - 0 Delay

SIMULATION TIME: 0.00

TOTAL	SYSTEM	BLUE	RED
	TANK	68	399
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	133
	TOTAL	318	754
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 754	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

TAB C

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SIMULATION TIME:   1.00
TOTAL          SYSTEM          BLUE   RED
                TANK            68 399
                ATGM           143 123
                AIR             21  12
                NUCLAR          64 188
                TOTAL          318 754
RESERVES                       124 219
STATUS OF SURVIVING FORCES
 318 754     TOTAL RAD SAFE
   0   0     TOTAL LATENT
   0   0     TOTAL FUNC IMP
   0   0     TOTAL INCAPAC
  CAUSE OF ATTRITION
  BLUE KILLED BY RED

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK             0       0       0      0       0       0       0
ATGM             0       0       0      0       0       0       0
AIR              0       0       0      0       0       0       0
NUCLAR           0       0       0      0       0       0       0
TOTAL            0       0       0      0       0       0       0
  TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  2 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  2 :    0


  RED KILLED BY BLUE

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK             0       0       0      0       0       0       0
ATGM             0       0       0      0       0       0       0
AIR              0       0       0      0       0       0       0
NUCLAR           0       0       0      0       0       0       0
TOTAL            0       0       0      0       0       0       0
  TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  1 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  1 :    0


CITY SML-FIRE      0 CITY LGE-FIRE      0 HECT
CITY SML-BDN       0 CITY LGE-BDN       0 HECT
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SIMULATION TIME: 3.00

TOTAL	SYSTEM	BLUE	RED
	TANK	68	398
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	318	753
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 753	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	1	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	1	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 3.00

TOTAL	SYSTEM	BLUE	RED
	TANK	65	395
	ATGM	140	123
	AIR	21	12
	NUCLAR	64	133
	TOTAL	312	750
RESERVES		124	219

STATUS OF SURVIVING FORCES

312 750	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	PAD
TANK	0	3	0	0	0	0	0
ATGM	0	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	6	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	PAD
TANK	1	3	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	1	3	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 4.00

TOTAL	SYSTEM	BLUE	RED
	TANK	61	392
	ATGM	140	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	308	747
RESERVES		124	219

STATUS OF SURVIVING FORCES

308 747	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	1	6	0	0	0	0	0
ATGM	0	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	1	9	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	4	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	3	4	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 5.00

TOTAL	SYSTEM	BLUE	RED
	TANK	61	386
	ATGM	136	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	304	741
RESERVES		124	219

STATUS OF SURVIVING FORCES

304 741	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	1	6	0	0	0	0	0
ATGM	4	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	5	9	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	8	5	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	8	5	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

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SIMULATION TIME:   6.00
TOTAL          SYSTEM          BLUE   RED
                TANK             56 386
                ATGM            134 121
                AIR              21  12
                NUCLAR           64 188
                TOTAL           297 739
RESERVES                        124 219
STATUS OF SURVIVING FORCES
 297 739     TOTAL RAD SAFE
   0   0     TOTAL LATENT
   0   0     TOTAL FUNC IMP
   0   0     TOTAL INCAPAC
  CAUSE OF ATTRITION
  BLUE KILLED BY RED

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK               3       9       0       0       0       0       0
ATGM               6       3       0       0       0       0       0
AIR                0       0       0       0       0       0       0
NUCLAR             0       0       0       0       0       0       0
TOTAL              9      12       0       0       0       0       0
  TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  2 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  2 :    0


  RED KILLED BY BLUE

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK               8       5       0       0       0       0       0
ATGM               0       2       0       0       0       0       0
AIR                0       0       0       0       0       0       0
NUCLAR             0       0       0       0       0       0       0
TOTAL              8       7       0       0       0       0       0
  TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  1 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  1 :    0


CITY SML-FIRE      0 CITY LGE-FIRE      0 HECT
CITY SML-BDN       0 CITY LGE-BDN       0 HECT
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SIMULATION TIME: 7.00

TOTAL	SYSTEM	BLUE	RED
	TANK	56	386
	ATGM	131	121
	AIR	21	12
	NUCLAR	64	188
	TOTAL	294	739
RESERVES		124	219

STATUS OF SURVIVING FORCES

294 739	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	9	0	0	0	0	0
ATGM	9	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	12	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	8	5	0	0	0	0	0
ATGM	0	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	8	7	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

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SIMULATION TIME:   8.00
TOTAL          SYSTEM          BLUE   RED
                TANK            56 386
                ATGM           131 121
                AIR             21  12
                NUCLAR          64 188
                TOTAL          294 739
RESERVES                       124 219
STATUS OF SURVIVING FORCES
 294 739     TOTAL RAD SAFE
   0   0     TOTAL LATENT
   0   0     TOTAL FUNC IMP
   0   0     TOTAL INCAPAC
  CAUSE OF ATTRITION
  BLUE KILLED BY RED

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK              3       9       0      0       0       0      0
ATGM              9       3       0      0       0       0      0
AIR               0       0       0      0       0       0      0
NUCLAR            0       0       0      0       0       0      0
TOTAL            12      12       0      0       0       0      0
  TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS    0

  TOTAL KT EXPENDED BY SIDE  2 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  2 :    0

  RED KILLED BY BLUE

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK              8       5       0      0       0       0      0
ATGM              0       2       0      0       0       0      0
AIR               0       0       0      0       0       0      0
NUCLAR            0       0       0      0       0       0      0
TOTAL             8       7       0      0       0       0      0
  TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS    0

  TOTAL KT EXPENDED BY SIDE  1 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  1 :    0

CITY SML-FIRE      0 CITY LGE-FIRE      0 HECT
CITY SML-BDN       0 CITY LGE-BDN       0 HECT
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AD-A102 577 ARMY WAR COLL CARLISLE BARRACKS PA F/G 15/7
COMBAT ENGINEER OPERATIONS IN A NUCLEAR/CONVENTIONAL ENVIRONMEN--ETC(U)
MAY 81 J R WHITLEY, J H ANDREWS, R A ROBERGE

UNCLASSIFIED NL

2 OF 2
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SIMULATION TIME:   9.00
TOTAL          SYSTEM          BLUE   RED
                TANK             56 386
                ATGM            131 121
                AIR              21  12
                NUCLAR           64 188
                TOTAL           294 739
RESERVES                        124 219
STATUS OF SURVIVING FORCES
 294 739     TOTAL RAD SAFE
   0   0     TOTAL LATENT
   0   0     TOTAL FUNC IMP
   0   0     TOTAL INCAPAC
  CAUSE OF ATTRITION
  BLUE KILLED BY RED

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK             3       9       0      0       0       0       0
ATGM             9       3       0      0       0       0       0
AIR              0       0       0      0       0       0       0
NUCLAR           0       0       0      0       0       0       0
TOTAL           12      12       0      0       0       0       0
  TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  2 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  2 :    0


  RED KILLED BY BLUE

SYSTEM          TANK    ATGM    CHEM   ARTY    BURN    BLAST   RAD

TANK             8       5       0      0       0       0       0
ATGM             0       2       0      0       0       0       0
AIR              0       0       0      0       0       0       0
NUCLAR           0       0       0      0       0       0       0
TOTAL            8       7       0      0       0       0       0
  TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS    0


  TOTAL KT EXPENDED BY SIDE  1 :    0.00 KT

  TOTAL NUC WEAPONS BY SIDE  1 :    0


CITY SML-FIRE      0 CITY LGE-FIRE      0 HECT
CITY SML-BDN       0 CITY LGE-BDN       0 HECT
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SIMULATION TIME: 8.00

TOTAL	SYSTEM	BLUE	RED
	TANK	56	386
	ATGM	131	121
	AIR	21	12
	NUCLAR	64	188
	TOTAL	294	739
RESERVES		124	219

STATUS OF SURVIVING FORCES

294 739	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	9	0	0	0	0	0
ATGM	9	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	12	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	8	5	0	0	0	0	0
ATGM	0	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	8	7	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 10.00

TOTAL	SYSTEM	BLUE	RED
	TANK	56	386
	ATGM	131	121
	AIR	21	12
	NUCLAR	64	188
	TOTAL	294	739
RESERVES		124	219

STATUS OF SURVIVING FORCES

294 739	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	9	0	0	0	0	0
ATGM	9	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	12	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	8	5	0	0	0	0	0
ATGM	0	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	8	7	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 11.00

TOTAL	SYSTEM	BLUE	RED
	TANK	56	386
	ATGM	131	121
	AIR	21	12
	NUCLAR	64	188
	TOTAL	294	739
RESERVES		124	219

STATUS OF SURVIVING FORCES

294 739	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	9	0	0	0	0	0
ATGM	9	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	12	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	8	5	0	0	0	0	0
ATGM	0	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	8	7	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 12.00

TOTAL	SYSTEM	BLUE	PED
	TANK	56	386
	ATGM	131	121
	AIR	21	12
	NUCLAR	64	183
	TOTAL	294	739
		124	219

RESERVES
STATUS OF SURVIVING FORCES

294 739	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION
BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	9	0	0	0	0	0
ATGM	9	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	12	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	8	5	0	0	0	0	0
ATGM	0	2	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	8	7	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE	0	CITY LGE-FIRE	0 HECT
CITY SML-BDN	0	CITY LGE-BDN	0 HECT

Run 2
No delay

SIMULATION TIME: .01

TOTAL	SYSTEM	BLUE	RED
	TANK	68	399
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	133
	TOTAL	318	754
RESERVES		124	219

STATUS OF SURVIVING FORCES

318 754	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	0	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 3.01

TOTAL	SYSTEM	BLUE	RED
	TANK	65	395
	ATGM	143	123
	AIR	21	12
	NUCLAR	64	188
	TOTAL	315	750
RESERVES		124	219

STATUS OF SURVIVING FORCES

315 750	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	3	0	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	3	0	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	2	2	0	0	0	0	0
ATGM	0	0	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	2	2	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 6.03

TOTAL	SYSTEM	BLUE	RED
	TANK	59	377
	ATGM	134	122
	AIR	21	12
	NUCLAR	64	188
	TOTAL	300	731
		124	219

RESERVES
STATUS OF SURVIVING FORCES

300 731	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION
BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	6	3	0	0	0	0	0
ATGM	6	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	12	6	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

-9T

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	11	11	0	0	0	0	0
ATGM	0	1	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	11	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

-22T

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 9.03

TOTAL	SYSTEM	BLUE	RED
	TANK	47	373
	ATGM	134	112
	AIR	21	12
	NUCLAR	64	188
	TOTAL	288	717
RESERVES		124	219

STATUS OF SURVIVING FORCES

288 717	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	16	5	0	0	0	0	0
ATGM	6	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	22	8	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

-21T

-26T

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	15	11	0	0	0	0	0
ATGM	10	1	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	25	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

SIMULATION TIME: 12.03

TOTAL	SYSTEM	BLUE	RED
	TANK	43	369
	ATGM	128	112
	AIR	21	12
	NUCLAR	64	188
	TOTAL	278	713
RESERVES		124	219

STATUS OF SURVIVING FORCES

278 713	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	20	5	0	0	0	0	0
ATGM	12	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	32	8	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	19	11	0	0	0	0	0
ATGM	10	1	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	29	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

(2)

- 25 T
- 15 ATGM

- 30 T
- 11 ATGM

SIMULATION TIME: 15.03

TOTAL	SYSTEM	BLUE	RED
	TANK	38	366
	ATGM	128	111
	AIR	21	12
	NUCLAR	64	188
	TOTAL	273	709
RESERVES		124	219

STATUS OF SURVIVING FORCES

273 709	TOTAL RAD SAFE
0 0	TOTAL LATENT
0 0	TOTAL FUNC IMP
0 0	TOTAL INCAPAC

CAUSE OF ATTRITION

BLUE KILLED BY RED

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	22	8	0	0	0	0	0
ATGM	12	3	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	34	11	0	0	0	0	0

TOTAL CONV KILL BY SIDE 2 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 2 : 0.00 KT

TOTAL NUC WEAPONS BY SIDE 2 : 0

RED KILLED BY BLUE

SYSTEM	TANK	ATGM	CHEM	ARTY	BURN	BLAST	RAD
TANK	22	11	0	0	0	0	0
ATGM	11	1	0	0	0	0	0
AIR	0	0	0	0	0	0	0
NUCLAR	0	0	0	0	0	0	0
TOTAL	33	12	0	0	0	0	0

TOTAL CONV KILL BY SIDE 1 OF RAD INCAP SYSTEMS 0

TOTAL KT EXPENDED BY SIDE 1 : 0.00 KT

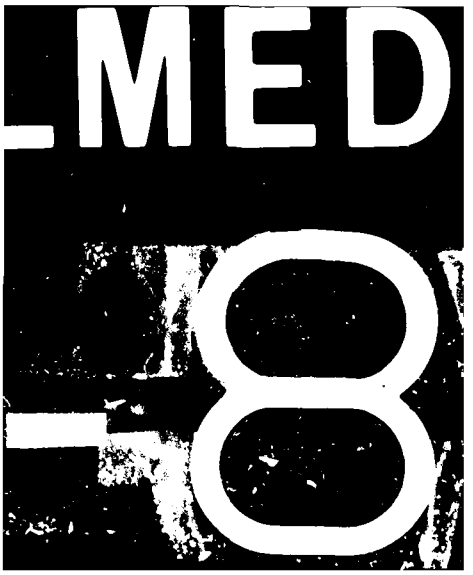
TOTAL NUC WEAPONS BY SIDE 1 : 0

CITY SML-FIRE 0 CITY LGE-FIRE 0 HECT
CITY SML-BDN 0 CITY LGE-BDN 0 HECT

End Run 2
No delay

- 30 T
- 15

- 33 T
- 12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